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The All-Volunteer Force: 1979 NLS Studies
of

Enlistment, Intentions to Serve,
and Intentions to Reenlist

by Choongsoo Kim

July 1982

Center for Human Resource Research
The Ohio State University

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<p>Three studies of the All-Volunteer Force system based on data from the first survey of a cohort of youth aged 14 to 21 on January 1, 1979 and part of the National Longitudinal Surveys of Labor Force Experience (NLS), are provided. Studies focus on factors affecting enlistment, intentions to serve, and intentions to reenlist. Among recent male high school graduates, military service is favored over college and other civilian pursuits as local labor market conditions deteriorate; individuals who desire to complete higher education are most likely to enter college;</p>					
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and those who want occupational training are more likely to enlist than to remain in the civilian sector. Among 14 to 17 year olds, excluding high school seniors, positive intentions to serve are inversely related to educational attainment and socioeconomic status and positively correlated with perception of approval. Among 18 to 21 year olds, excluding high school seniors, intentions to enlist are positively related to post-service educational benefits among blacks and Hispanics and occupational training among whites. Among white high school seniors, intentions to serve are inversely related to socioeconomic status and positively related to the desire to obtain occupational training and poorer local labor market conditions. Job satisfaction, marriage status, employment outlook and knowledge of the labor market, and length of service are related, either positively or negatively, to reenlistment intentions among males and females.

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The All-Volunteer Force: 1979 NLS Studies of Enlistment,
Intentions to Serve, and Intentions to Reenlist

by

Choongsoo Kim

Center for Human Resource Research

The Ohio State University

Final Report

July 1982

This report was prepared under a contract with the Employment and Training Administration, U.S. Department of Labor, under the authority of the Comprehensive Employment and Training Act. Funding for this report came from the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics), the Army Research Institute, the Office of Naval Research, and the Air Force Office of Scientific Research. Researchers undertaking such projects under Government sponsorship are encouraged to express their own judgments. Interpretations or viewpoints contained in this study do not necessarily represent the official position or policy of any of the sponsoring agencies.

PREFACE

This report covers the first survey of a cohort of youth who were age 14-21 on January 1, 1979. The cohort will be interviewed annually for the next five years to trace the experiences of the youth over the period. The purpose of these surveys is to better understand the factors affecting success in the labor market and in life generally.

This cohort of youth is part of the National Longitudinal Surveys of Labor Force Experience (NLS), which were begun in 1966. Funding for the NLS comes from the Office of Research and Development and Office of Youth Programs, Employment and Training Administration, U.S. Department of Labor and a funding consortium for the military component consisting of the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), Army Research Institute, Air Force Office of Scientific Research, and the Office of Naval Research.

A key role in the design of the military component of the NLS was played by Zahava D. Doering and David W. Grissmer, The Rand Corporation. They initiated the idea of a military component and designed the military portion of the questionnaire. The funding consortium was coordinated by Al Martin, Director, Accession and Retention, Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics). Support for the selection of the military sample and assistance in the location of military personnel was ably provided by Kenneth C. Scheflen, Chief, Defense Manpower Data Center and his staff.

Overall responsibility for the NLS rests with the Center for Human Resource Research, The Ohio State University, which designed the questionnaires, analyzed the data and provided the data to the public. Sample design and data collection for the youth cohort were conducted by the National

Opinion Research Center (NORC). The Survey Director at NORC for this project was Celia Homans; sampling design was the responsibility of Martin Frankel. Other NORC senior staff who made substantial contributions were Mary Catherine Burich, Wendi Kreitman, and Karin Steinbrenner.

Each chapter in this report was presented at a workshop at the Center for Human Resource Research. I am grateful to the workshop participants for their useful comments and particularly to Michael E. Borus for his many helpful suggestions and substantial assistance throughout this study. Comments by Drs. Zahava Doering and David Boesel, Defense Manpower Data Center, are also gratefully acknowledged, as are those of Lt. Col. Pat Lerro (OASD/MRA&L). I also wish to thank Kezia Sproat for comments and excellent editorial assistance; John Jackson and Julia Zavakos for competent research assistance; and Sherry Stoneman McNamara for excellent clerical assistance. However, I am solely responsible for any errors.

EXECUTIVE SUMMARY

This monograph presents three studies of the All-Volunteer Force system: factors affecting enlistment, intentions to serve, and intentions to reenlist. The 1979 Youth Cohort of the National Longitudinal Survey of Labor Market Experience is the basis of analysis.

Choice Among Military Enlistment, College Enrollment, and Other Civilian Pursuits

Among male youth who were graduated from high school with a diploma between May and December, 1978, we find:

1. Military service is favored over college and other civilian pursuits as local labor market conditions deteriorate. This pattern is particularly apparent among white male youths.
2. Individuals who desire to complete higher education are most likely to enter college, but among those who are not going to college, military service is preferred to civilian activities.
3. White males who want occupational or on-the-job training are more likely to enlist in the armed forces than to remain in the civilian sector; apparently many white youths view service in the military as a means of obtaining some skills which might be transferable to their future civilian life.

The Supply of Potential Armed Forces Personnel

Males 14 to 21 years old who never served in the active forces are categorized into three mutually exclusive groups. Among 14 to 17 year olds, excluding high school seniors:

1. Positive intentions to serve are inversely related to educational

attainment and socioeconomic status and positively correlated with the perception of approval of enlisting in the military by the person who has the greatest influence upon the respondent's decisions.

2. Black youths who expect to attain fewer years of schooling than they desire are more likely to intend to enlist.
3. Poor local labor market conditions have a positive effect on the enlistment intentions of white youths.

Among 18 to 21 year olds, excluding high school seniors:

1. Among black and Hispanic youths, the principal reason for intending to enlist is to take advantage of the post-service educational benefits, while obtaining occupational or on-the-job training other than regular schooling appears to be the primary motivation among whites.
2. Among white youths, the intention to enlist is negatively related to actual (or expected) earnings.

Among high school seniors:

1. An inverse relationship appears between intentions to serve and socioeconomic status among whites.
2. The desire to obtain occupational training and poorer local labor market conditions are positively related to intentions to serve among white youth.

The Supply of Potential Reenlistments

There are a number of important correlations between intentions to reenlist and selected individual characteristics among military male and female personnel serving their first term of duty in the active forces, among them:

1. Job satisfaction of military personnel serves as a strong indicator of

positive reenlistment intentions; this implies that service in the military is regarded by many as a career, an alternative to civilian employment.

2. Married service men are more likely to intend to reenlist, but married service women are less likely to intend to reenlist than their unmarried counterparts.
3. Minority male personnel who are less knowledgeable about the labor market and white male personnel who think they do not have control over their future are more likely to intend to reenlist than their corresponding peers.
4. A significant inverse relationship exists between length of service and intentions to reenlist among males but not among females. A significant relationship between pay levels and positive reenlistment intentions could not be found among either males or females.

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INTRODUCTION

Since the termination of the military draft in 1973, military authorities have had to compete directly with the civilian economy to procure manpower. Under the All-Volunteer Force (AVF) system, young men are not obligated to serve, nor does a threat of draft exist; as has always been true for young women, young men are free to choose between military service and civilian jobs.

This study, based upon the 1979 data from the Youth Cohort of the National Longitudinal Surveys of Labor Market Experience (NLS), addresses the following three issues: first, How do personal characteristics determine who will serve in the military rather than remain in the civilian sector and go on to college or secure a job? Second, What kinds of individuals are most likely to enlist in the armed services in the future? Third, Which of those who are currently serving their first term of duty are most likely to reenlist? Profiles of young men and women who participate in the armed services and some related issues are presented and discussed in detail in an earlier report (see Kim et al., 1980). In contrast to the cross-tabular analyses employed in the earlier report, more rigorous methodologies are adopted here.

Chapter I examines why individuals with similar human capital attributes, i.e., members of an educational cohort, decided to take different paths. The main question will be: Among young men who were graduated from high school in 1978, why did some choose to go on to college, some decide to join the armed forces, and some choose to remain in the civilian economy?

Chapter II identifies potential armed forces personnel and analyzes personal characteristics of male youths who intend to enlist in the military service in the near future. Particular attention is paid to ability, as measured by educational attainment and knowledge of the world of work score.

We also examine whether or not the individual attributes of youth who have positive intentions to enlist represent a cross-section of the youth population. Findings in this analysis should be helpful for effective recruiting strategies.

Chapter III identifies the first-term service members who have positive intentions to reenlist at the end of their term of duty. Increasing the retention rate of experienced service personnel has the obvious advantage of saving recruitment and training costs associated with new accessions. We investigate in this chapter the relationships between positive reenlistment intentions and a number of factors expected to affect the reenlistment decision--job satisfaction status, relative pay level between military and expected civilian pay, locus of control, marital status, and educational desire.

The primary source of military manpower is the youth labor market. The seemingly successful operation of the AVF system during the 1970s appears in retrospect to have been due to the entrance of the baby boom cohort into the labor market, which created an oversupply of young workers, and to the much deteriorated youth labor market conditions during that period, possibly also a consequence of the overcrowding phenomenon. Because the currently shrinking youth population is expected to adversely affect recruitment and retention efforts, understanding the characteristics of the individuals who have participated or intend to enlist in the armed forces is essential to establishing appropriate military manpower policies.

Chapter I

Choosing Among Military Enlistment, College Enrollment, and Other Civilian Pursuits

A myriad of studies of the youth labor market in recent years have focused on youth unemployment,¹ but they have not adequately considered the typical process whereby youth choose simultaneously among several alternative labor market activities. Because the early years are the best time to accumulate human capital by direct investment in education or on-the-job training, some young men do not participate in the labor market but choose instead to enroll in school or join the armed forces. Although this variety of available choices complicates our view of the youth labor market, exploring the relationships among these three alternatives will provide a better understanding of the sources of potential military manpower.

This study takes account of the fact that young people make tradeoffs in their choices of school, jobs, and military service by examining the determinants of the various activities under the constraint that an increase in the probability of participating in a certain activity (e.g., the military) due to a change in some factors will be assumed to necessitate compensatory decreases in the probability of participating in one or both of the other activities (e.g., school and/or the labor market).

The main hypothesis to be tested holds that individuals with higher intellectual ability or of higher socioeconomic status will elect to attend college; among the groups who do not go to college, however, those individuals with higher educational aspirations and those who desire specific occupational training are more likely to participate in the armed forces, because they see

¹See for example, Freeman and Wise (1980), Feldstein and Ellwood (1979), and Wachter and Kim (1980).

military service as a way of obtaining post-service educational benefits or specific training. We also test the hypothesis that individuals who face more adverse labor market conditions are more likely to enlist in the armed services.

This chapter is organized into five sections. In Section I, the activity choice model is specified; descriptive statistics are presented in Section II; empirical estimates of the multiple logit activity choice model are reported and discussed in Section III. The fourth section deals with the partial derivatives of estimated coefficients, and a summary of findings and policy implications are contained in the final section.

I. Specification of the Activity Choice Model

We first assume that each individual faces three pairwise mutually exclusive choices: military enlistment, college enrollment, and other civilian activities. Which of these activities is chosen will depend mainly on the individual's socioeconomic status, family size, ability, educational aspirations, and (state) labor market conditions. Our reasons for including the above variables in the activity choice model and the expected relationships between each of the three choices and the explanatory variables are discussed below.

Socioeconomic status. The educational attainment and occupational status of the parents and home environment (if newspaper, magazine, and library card were accessible when respondent was age 14) proxy for the socioeconomic status of the respondents.² Individuals from families with higher socioeconomic

²The family income variable was a primary choice for this measure, but it was not used for two reasons. First, it had a very high percentage of missing data, and imputing up to 20 percent of the sample data was not desirable. Second, we did not have information about parental income for most of those

status are expected to prefer activities with higher nonpecuniary returns, and they are better able to defer earnings until after college; individuals from families with lower socioeconomic status, on the other hand, are more likely to choose activities which bring higher and more immediate monetary returns.³ For these reasons, and assuming that investments in higher education accrue relatively more nonpecuniary returns such as prestige, intellectual growth, etc., socioeconomic status is expected to have a positive impact on college enrollment. Further, under the assumption of an imperfect capital market the costs of education are less of a burden on wealthy persons than on poorer persons because family support is the most easily accessible source of education financing. Moreover, to the extent that education represents a luxury or consumption good as well as an investment good, a wealthy family may consume more education than a poor family.⁴

who joined the armed forces because these people were living apart from their parents and thus constituted independent family units.

³Assume that each individual maximizes a well-defined utility function, $\max U(K_i, (E_i + E); Z)$, where K_i is expected nonpecuniary returns from activity i , E_i is expected pecuniary returns from activity i , E is an individual's wealth endowment, and Z is a vector of all other characteristics of activities. Since an individual from a wealthy family has a higher E than an individual from a poor family, the marginal utility of the expected monetary returns will be less for a wealthy person than for a poor person.

⁴Recently, some researchers have found a disequilibrium behavior in investment in education, particularly in analyses where only monetary returns from investment are emphasized. Carol and Perry (1975) show, for example, that the person who must pay for his college education in chemistry would do better in terms of lifetime income to become a plumber. Some students enter graduate studies in fields where the internal rate of return is very low or even negative (see Schaafsma (1976), Dodge and Stager (1972)). Although these may be extreme examples, it is very likely that an individual with lower educational attainment may earn more than a person with higher educational attainment, even when all observed characteristics are controlled. An interesting possible explanation for this disequilibrium phenomenon is that it occurs because the decision to invest in human capital is frequently made by the parents, not by the youths (see Tannen (1978)). Therefore, parents' preferences (often biased) play an important role in decision making and should be taken into account. A counterargument is that parents' decisions are generally more rational than youths' decisions. In any case, the parents'

Family size. An individual with a large number of siblings may perceive his opportunity to invest in higher education to be smaller, if all else is equal, than someone with fewer siblings, because he has a smaller proportion of available funds from parents. Second, an individual with a large number of siblings receives on average much less parental time.⁵ Family size is therefore expected to be inversely associated with college enrollment and positively associated with participation in the military and other civilian activities.

Parental status. While career succession between one generation and the next may be a general phenomenon, some empirical studies (e.g., Faris, 1981) show that family tradition has been a particularly important factor for enlistment. On the other hand, Gottlieb (1979) reported that the desire to escape from familial problems is one of the important reasons for enlistment. In order to incorporate the above arguments into the model, we introduce the following two variables: parents in military (if respondent's parent was in the military service as of interview date or when respondent was 14 years old), and single parent family (if respondent did not live with both of his natural parents at age 14).

Ability. As a measure of ability, the score on the Knowledge of the World of Work test (KOWW) is used.⁶ Because human capital theory holds that, educational attainment variable is expected to be a strong predictor of college enrollment.

⁵To the extent that parental time is considered a superior good for child education and is positively correlated with ability, the family size variable is an indirect measure of the ability of an individual. For detailed discussions of the relationships between sibling position and family time, see Lindert (1977). For general discussions of the demographics of family size, see Easterlin (1978) and Olneck and Wolfe (1980). Leibowitz (1977) tested the hypothesis of positive correlation between parental time and children's achievement.

⁶The KOWW score is based upon multiple-choice questions which asked

if all else is equal, an able person will invest more in higher education than a less able person, this ability measure is expected to have a positive impact on college enrollment.⁷

Educational aspirations and desire for occupational training. Obviously, other things held constant, the individual's desire for higher education should positively affect college enrollment.^{8,9} Also, it is hypothesized that youths who desire to receive occupational or on-the-job training are more likely to enlist in the armed services than to go on to college or remain in the civilian economy. A dummy variable "training" is introduced to test this

respondents to identify the duties of the following nine occupations: hospital orderly, department store buyer, key punch operator, fork lift operator, medical illustrator, machinist, dietician, economist, and assembler. This variable is considered to represent primarily the extent of an individual's information on the occupational structure of the labor market. However, previous studies show that this variable is highly correlated with individual ability and knowledge. See Parnes and Rich (1980), Griliches (1976).

⁷Assuming that the human capital production function is well shaped, the optimum amount of investment occurs where marginal product equals marginal cost. Since, by definition, an able person is assumed to have a higher marginal product at a given investment level than a less able person, he should invest more in order to equate his marginal product with the (given) marginal cost. The well shaped function is continuous and twice differentiable, and the first derivative is positive but the second derivative is negative. For a detailed discussion, see Becker (1975).

⁸If the amount of education which maximizes the net present value of nonmonetary returns is different from that needed to maximize the net present value of monetary benefits, the actual optimal amount will be a weighted average of the two points, and it will depend upon the marginal rate of substitution between monetary and nonmonetary benefits. It may well be that individuals who desire higher education assign greater weight to nonpecuniary returns, so that their expected returns from education may be higher than those who have lower aspirations for education.

⁹It is highly likely that educational expectations (i.e., the number of years of education an individual actually expects to complete) are a stronger predictor than educational aspirations of the choice of activities. However, the educational aspiration variable is chosen because the educational expectation variable seems to be endogenous rather than exogenous: the direction of causality between educational expectation and activity choice may be simultaneous.

hypothesis.

Labor market conditions. Unemployment rates are used to capture the effects of labor market conditions. At any given wage level, expected earnings will depend upon employment probability.¹⁰ Since there is no unemployment in the armed forces, if labor market conditions are anticipated to deteriorate, these anticipations will make the expected earnings from enlisting relatively higher than the expected earnings from the civilian alternatives. Therefore, unemployment rates are expected to be positively associated with the decision to enlist in the military.

On the other hand, unemployment rates are also expected to positively affect college enrollment. To the extent that foregone earnings comprise an important component of the cost of investment in education, higher unemployment rates will lower the earnings expected from employment and thus the foregone earnings. Thus enrollment in college would also be expected to increase in the presence of weak labor market conditions.¹¹

¹⁰The wage variable should play an important role in activity choices. For the following two reasons, however, the wage variable is not explicitly introduced. First, the relevant wage rates based on a concept of opportunity costs for those enrolled in school or not in the labor force could not be easily measured. Second, jobs with on-the-job training opportunities generally pay lower wages at the entry level than jobs with no training benefits. Therefore, the wage rates for entry level jobs may not represent the true expected earnings from employment.

¹¹Theoretically, this expectation can be justified but empirically it is not quite clear. Indeed, the most desirable unemployment rates to use are age-race-sex specific. If youth unemployment rates are lower than the overall unemployment rates, for example, what is actually captured by using overall (all-age) unemployment rates of the local labor market might be simply (family) income effects. That is, higher unemployment rates will indicate lower overall income for families; thus, they may negatively affect decisions on college enrollment. Another unemployment rate which might also affect choice of activities may be the personal experience of unemployment, in contrast to the above perceived unemployment rates. However since the analysis group consists of a very young age group and since a majority of the individuals in this study went on to college or joined the armed forces upon graduation from high school (all of them were in school before May 1978), few

Other variables. The following two variables are also added: "South" (if respondent lived in the South as of May, 1978) and "Discrimination" (if respondent thinks he has been discriminated against on the basis of race, age, nationality, or language). The former variable is expected to capture Southerners' differential preferences for the military service relative to non-Southerners', while the latter examines whether or not youths perceive that discrimination is less serious a problem in the military.

Generally, the factors affecting the schooling decision can be distinguished from those affecting nonschooling decisions. However, except in terms of the last variable--labor market conditions--it has not been clear, among those who are less likely to enroll in school, why some people decided to participate in the military service and others did not. These distinctions can at best be attributed to unmeasurable differences in individual tastes. For example, if economic reward is the single most important factor in the enlistment decision, then ability and enlistment should be negatively associated, because military pay is based upon a fixed schedule whereby all people are paid the same at entry regardless of their human capital accumulation. This pay determination method gives more incentive to enlist to those who are less qualified than to those who are highly qualified. In a sense, once accepted, the above average quality person is undercompensated, while the below average quality person is overcompensated.¹² However, if the

youths in this study have ever experienced any serious (i.e., out-of-school) unemployment. Therefore, this variable is not introduced.

¹²The military service provides numerous bonuses and post-service educational benefits to enlistees. Furthermore, basic pay is only one of the components of regular military compensation (RMC), which also consists of allowances for subsistence and quarters and federal income tax advantages. In a broad sense, all these items should be included in the computation of monetary rewards. However, the inclusion of the above mentioned items in the estimation of monetary rewards does not alter the argument given in the text.

purpose of enlistment is to obtain some skill or to take advantage of post-service educational benefits, then a positive association can also be expected, when the effects of other variables such as socioeconomic status are controlled. Thus it appears that why some people join the armed forces while others choose to remain in the civilian economy is an empirical question rather than a theoretical one.

II. Descriptive Statistics

The universe of this study is males who graduated from high school with a diploma between May and December, 1978; that is, the 1978 high school class.¹³ The data were gathered from January through August, 1979. The sample consists of 504 male youths: 329 whites, 112 blacks, and 63 Hispanics.¹⁴ Earlier studies (see, for example, Kim et al., 1980) report that the individual characteristics of enlistees in terms of socioeconomic status and ability differ between white and minority youths; therefore, separate analyses are performed for whites and minorities. Because the sample size is too small, we will not discuss Hispanic youth separately; instead they will be combined with blacks to constitute a minority youth group.

We chose high school diploma graduates as the basis of analysis because

¹³There are two different classifications for high school graduates. The first is based upon the attainment of education--12 years of schooling completed. The second is in accordance with the possession of either a GED or diploma. In this study, we narrowed the definition further, i.e., it is restricted to those who received diplomas. The primary reason for this restriction is that very few of the GED possessors actually went on to college, and thus it was suspected that the quality of these people might be somewhat different from that of the diploma graduates. The primary reason that we chose the most recent educational cohort as the basis of our analysis is to avoid the complex timing and cohort effects which would occur if several different groups were combined.

¹⁴We refer to all non-Hispanic, nonblack youth as "white" since only about two percent are of Asian, Pacific Island, or Native American descent.

at the time there was a growing concern that the proportion of high school dropouts in the AVF, particularly in the Army, had been increasing, while in the society as a whole, the proportion of high school graduates had been increasing (see for example, U.S. Senate Hearings, 1978a,b).¹⁵ In this regard, the viability of the "quality" AVF system was (and is) considered to depend upon its ability to recruit a cross-section of the high school graduate population.

The dependent variables were constructed as follows: the category military (M) consists of the individuals who joined the armed forces after their graduation from high school. The next category, college enrollment (C), includes all members who ever went on to a college of any kind. The third category, other civilian activity (O), comprises all individuals who do not belong to either of the previous categories.¹⁶

Table 1.1 presents the proportions of 1978 male high school diploma graduates belonging to each category. Our sample represents a population of approximately 1.6 million; 85 percent are whites, and 15 percent are minority youths of whom 73 percent are blacks. About 3 percent of the white young men participated in the military service, whereas about 6 percent of the minority youths did. Of those who did not enter the military, 47 percent went on to college.

The mean values and the coefficients of variation for the independent variables discussed in the earlier section appear in Table 1.2.¹⁷ These are

¹⁵By 1981 accessions had improved markedly.

¹⁶There are a small number of people who changed their status between their graduation date and the interview date. For these individuals, a hierarchical ordering was applied. The first priority was given to the category M, the second to C, and the third to O.

¹⁷The seemingly too high mean values of siblings may be explained as

Table 1.1 Distribution of 1978 Male High School Diploma Graduates, by
Activity and Race: 1979

(Percentage distribution)

Activity	White	Minority ^a	Black	Total
Military	2.7 (12.2) ^c	6.3 (10.3)	6.7 (12.5)	3.2 (11.5)
College	46.4 (39.8)	41.5 (37.7)	45.0 (40.2)	45.7 (39.1)
Other	51.0 (48.0)	52.2 (52.0)	48.3 (47.3)	51.1 (49.4)
Total percent	100.0	100.0	100.0	100.0
Total number (thousands) ^b	1,363	234	171	1,597
Sample size	329	175	112	504

^aMinority group consists of blacks and Hispanics.

^bThese numbers represent the population estimates: each respondent was given a sampling weight which is the inverse of the probability of being selected.

^cNumbers in parentheses indicate the percentage distribution of unweighted samples.

Table 1.2 Mean Values and Coefficients of Variation (CV)^a for Selected Explanatory Variables by Activity and Race:^b 1978 Male High School Diploma Graduates^c

Variable ^d	Military		College		Other	
	Mean	C.V. ^a	Mean	C.V.	Mean	C.V.
Parental education						
White	13.0	.16	14.5	.18	12.5	.22
Minority	11.9	.17	12.5	.25	11.1	.27
Number of siblings						
White	4.9	.48	3.4	.49	4.0	.41
Minority	5.4	.25	4.2	.62	6.5	.58
Ability ^e						
White	7.3	.22	7.7	.19	6.8	.25
Minority	6.2	.30	5.8	.38	5.2	.41
Educational aspiration						
White	15.1	.15	16.5	.08	13.8	.14
Minority	15.5	.11	16.6	.07	14.5	.14
Unemployment rates						
White	5.0	.25	4.5	.24	4.7	.28
Minority	11.4	.33	11.1	.29	10.3	.25

^aThe coefficient of variation is the standard deviation divided by the mean.

^bTo compute the mean values, the sampling weights were introduced to obtain population estimates.

^cMean values and coefficients of variation of other variables are presented in Appendix I-A.

^dFor variable explanations, see glossary.

^eKnowledge of the World of Work test scores. The scores range between zero and nine.

generally consistent with our expectations. The characteristics of those in college were, in most cases, obviously differentiable from the characteristics of those in either the military or other categories: those in college had consistently higher mean values of parental education, fewer siblings, and higher educational aspirations than those in military or other categories. Individuals who chose to participate in the armed forces came from higher socioeconomic status families and aspired to higher educational attainment than those who elected to remain in "other civilian activities." They are also more likely than their civilian counterparts to come from states with high unemployment rates.¹⁸ These patterns hold for both white and minority respondents. However, some significant racial differences were discerned: whereas among whites the ability measure was highest for those in college, among minorities it was highest for those in the military. Although the average number of siblings was higher for those in the military than for those in the other category among whites, the reverse pattern was observed in the minority group.

III. Multiple Logit Estimates for Activity Choice Probability

Each individual in our universe is assumed to choose one and only one activity among the three available choices. We will apply a multiple logit

follows. First, we added one to include the respondent himself. Second, siblings may include children who are not brothers and sisters by birth.

¹⁸The race-sex specific state unemployment rate is used as a proxy for the local unemployment rate. The Current Population Survey (CPS) provides monthly unemployment rates for about slightly over 200 SMSA areas. However, the CPS local unemployment rates are not available by race and sex. Therefore, choosing between state unemployment rate and CPS local unemployment rate is a matter of tradeoff between race-sex specific information and more disaggregated locality information. In this study, we chose the race-sex specific unemployment rates because the variations in unemployment rates among different race-sex groups are thought to be more important for this race-specific analysis than those among closely adjacent local areas.

estimation technique to predict the responses of the dependent variable.¹⁹

White Males The estimated multiple logit equations for white males are reported in Table 1.3.²⁰

The socioeconomic status of the respondents is proxied by three

¹⁹The multiple logit technique is used to estimate probability when more than two responses are possible by satisfying both the boundary condition (i.e., the probability estimates should be bounded by zero and one) and the linear restriction (i.e., the sum of all probability estimates should equal one). We estimate the following log-odds equations for each race group.

$$\ln(P_2 / P_1) = XA_a \dots (1)$$

$$\ln(P_3 / P_1) = XA_b \dots (2)$$

where P represents the probability estimates, "1" = military, "2" = college, "3" = other, A_a and A_b are column vectors of coefficients and X indicates a matrix of explanatory variables. The log-odds equation, for example $\ln(P_2 / P_1)$, is called the conditional logit favoring the second choice relative to the first choice under the condition that the choice be either the first or the second. From the above equations we can estimate the ratios of the predicted probabilities. The absolute values for each of the three probabilities are then determined by the condition that the sum of the predicted probabilities for each individual be equal to one. More formally, from the identity relationship $P_1 + P_2 + P_3 = 1$, we calculate the estimated probabilities as $P_1 = 1/Z$, $P_2 = \text{Exp}(XA_a)/Z$, and $P_3 = \text{Exp}(XA_b)/Z$, where $Z = 1 + \text{Exp}(XA_a) + \text{Exp}(XA_b)$. A property of logit analysis is that from the above equations we can also derive the equations for other comparisons. Readers are reminded of the independence of the irrelevant alternatives property of the logit estimators discussed in Appendix I-B. Because of the symmetry of the logistic distributions, the estimates are qualitatively invariant with respect to the choice of the denominator. That is, we can easily derive an equation comparing choice "2" over choice "3", i.e., $\ln(P_2 / P_3)$, as follows.

$$\begin{aligned} \ln(P_2 / P_3) &= \ln(P_2 / P_1) - \ln(P_3 / P_1) \\ &= (A_a - A_b) X \dots (3) \end{aligned}$$

For an occupational choice model using a multiple logit model, see Schmidt and Strauss (1975). Extensive theoretical discussions about the logit analysis are found in Cox (1970), Theil (1969), and particularly in the appendix in Theil (1970).

²⁰Numbers in parentheses represent the asymptotic t-values. The estimations are actually made for the coefficients and standard errors in columns 1 and 2. The third column was derived based upon the formula (3) in footnote 19, and the variance-covariance matrix of coefficients. Maximum likelihood estimating procedure was applied; sampling weights were not introduced in the estimations.

Table 1.3 Multiple Choice Logit Estimations: White Male 1978 High School Graduates^a

Independent variable	College/Military	Other/Military	Other/College
Constant	-0.0531 (-0.02)	10.680** (4.79)	10.733** (5.74)
Parental education	-0.00782 (-0.08)	-0.0252 (-0.26)	-0.0174 (-0.24)
Parental occupation	1.393** (2.7')	0.400 (0.82)	-0.992** (-2.77)
Home environment at 14	1.128** (2.37)	0.919** (2.07)	-0.209 (-0.58)
Siblings	-0.317** (-2.96)	-0.168* (-1.87)	0.149 (1.62)
Single parent family	0.688 (1.06)	0.831 (1.41)	0.143 (0.31)
Parent in military	-0.246 (-0.22)	-0.769 (-0.86)	-0.523 (-0.49)
Ability measure	0.0840 (0.62)	-0.0271 (-0.23)	-0.111 (-1.08)
Educational aspirations	0.248* (1.92)	-0.470** (-4.16)	-0.718** (-7.32)
Training	-1.407** (-2.65)	-0.712 (-1.35)	0.695** (2.02)
Unemployment rate	-0.401** (-2.19)	-0.205 (-1.22)	0.197 (1.37)
Discrimination	-0.329 (-0.74)	-0.389 (-0.93)	-0.0597 (-0.18)
South	-1.236** (-2.13)	-0.473 (-0.88)	0.763* (1.73)

^a Numbers in parentheses represent asymptotic t-statistics.

**Significant at the .025 level, one-tailed test.

* Significant at the .05 level, one-tailed test.

variables: educational attainment of parents, occupational status of parents, and a dummy variable representing the environment when the respondent was young. Although some degree of collinearity among these three variables obviously might have lowered the significance of each coefficient, all three variables were kept in the specification because each variable captures a somewhat different aspect of socioeconomic status. Surprisingly, the educational attainment of parents variable, which was expected to be a strong predictor for activity choice, turned out to show unexpected signs and be statistically non-significant. However the other two variables showed the expected signs and their coefficients were in general statistically significant. Individuals whose parents are engaged in white collar occupations are more likely to attend college than to join the military or pursue other civilian activities. However, parental occupation did not distinguish statistically between the likelihood of joining the armed forces and of pursuing other civilian activities. On the other hand, young men brought up in environments where newspapers, magazines and a public library system were easily accessible were less likely to participate in the military service. In short, parental occupation is a strong indicator of the youth's probability of enrolling in college, while environment when the respondent was young is a good predictor of the likelihood of joining the armed forces.

The coefficients of the sibling variable indicate that the larger the family, the more likely a young man is to enlist in the military rather than to attend college or remain in the civilian sector. Moreover, when the choice is narrowed to college or other civilian activities, an individual from a large family is less likely to attend college.

Another variable used to capture familial relationships is the dummy

variable for single parent family, which indicates whether or not respondents were living with both their natural parents when they were age 14. This variable was introduced because it has been frequently stated that an important motivation for enlisting in the armed forces is to escape from troublesome family relationships or environments.²¹ Our results, however, do not support this contention. On the contrary, the results indicate that youth who came from two-parent homes were more likely to enlist than those from single-parent families, although the statistical significance is not very high.²²

We also included a dummy variable indicating whether a parent was serving in the military either at the time of interview or when the youth was age 14. The coefficients showed the expected signs; youths whose parents are or were in the military service have higher probabilities of joining the military service, but the coefficients were not statistically significant.

The knowledge of the world of work test scores, used as a measure for individual ability, produced the expected coefficient signs, but the coefficients were statistically non-significant. This result is rather puzzling because individual ability was expected to be a strong predictor of activity choice. Two explanations for the the poor performance of this variable can be conjectured. First, as noted earlier, this measure may not serve as a good proxy for ability: it may simply capture the degree of labor

²¹Gottlieb (1979) reported that a little more than half the enlistees interviewed indicated that the major reason for enlistment was the desire to escape problems at home, parental conflict, etc.

²²A primary reason that our study does not support the conventional wisdom may be that our sample does not include high school dropouts, who comprise approximately 40 percent of enlistments.

market information.²³ Second, this ability measure is itself highly correlated with other explanatory variables such as socioeconomic status; thus, the net effect of ability may not be as strong as expected on the average. Furthermore, since our analysis is based upon an educational cohort, the variations in this measure may be relatively small and its explanatory power substantially lowered.

The educational aspiration variable was highly significant and yielded the expected relationships. Individuals who desire to attain higher education are more likely to enroll in college than to enlist in the military or pursue other civilian activities. However, when the choice is either the military or a noncollege civilian pursuit, an individual with higher educational desire has a higher probability of choosing the armed forces over remaining in the civilian economy than an individual with lower educational desire, other things equal. Considering that military service offers post-service educational benefits to those who may not be able to afford the costs of higher education, this result is not surprising.

The above results are particularly significant when the effect of opportunity for occupational or on-the-job training is also taken into account. Youths who wanted to receive job related training were more likely to favor the armed services over nonmilitary activities than those who did not want to receive training. The availability of job or occupation specific training does indeed appear to be a good incentive for military enlistment among those who are not college bound.

The effects of the labor market conditions (race-specific state unemployment rates) also turned out as expected: the poorer the labor market

²³Many youngsters from upper-middle class families, for example, may be very able but know little about the world of work.

conditions, the greater the likelihood of enlistment. Since there is no risk of being unemployed while in the military service, worsening labor market conditions will enhance the individual's expected returns from enlisting compared to not enlisting.²⁴

Finally, two more control variables were included, a dummy variable for discrimination and a dummy variable for South. Because discrimination is less serious a problem in the military, we expected that those who think that race, sex, or age discrimination operated against them in the labor market would have higher probabilities of preferring the armed forces to alternative nonmilitary activities than those who do not. Although the coefficients showed the expected signs, they were not statistically significant. Southerners relative to non-Southerners show higher preference for the military service than for nonmilitary activities, with college the least preferred choice. This South dummy variable may capture Southerners' differential preferences, but it probably also captures income effects; average income levels are lower in the South, so Southerners may be less able to afford higher education.

Minority Males We estimate separate equations for white and minority groups because we suspect that the behavioral patterns about the activity choice process might be different for the two groups. During the all-volunteer force period, minorities have had a higher representation in the

²⁴The positive coefficient on other civilian pursuits as compared to attending college (the coefficient of the third column) was somewhat surprising. We also expected that unemployment rates would positively affect the school enrollment decision because higher unemployment rates would imply lower foregone earnings due to schooling. A possible explanation of this unexpected sign is that the unemployment rates might have captured income effects of unemployment. Due to a reduction in family income, respondents were not able to afford to pay for high educational costs.

armed forces than in the total population.²⁵

Since the estimated coefficients and their interpretations were discussed extensively in the previous section, our discussion now will be confined to the observed differences between the minority and white groups. The equations for the minority group and for whites are very similarly specified and the estimated multiple logit equations for minority males are reported in Table 1.4.²⁶ Because two race groups are combined, a dummy variable for blacks is added.

No significant differences in the signs of the coefficients are found between whites and minorities, although the statistical significance levels of the coefficients for the minority group are, in general, lower than for whites.²⁷ The only significant relationship is between educational

²⁵Although blacks represent less than 15 percent of the total youth population, they accounted for approximately 25 percent of total enlistees. Table 1.1 also showed that the enlistment rate of the minority group is about twice that of whites. The disproportionate racial composition has been more apparent among enlistees in the Army than in other services.

²⁶Originally the same set of explanatory variables was used as in the whites' equation. The dummy variable for parental occupation in the military service was dropped due to few positive responses. Two other variables, desire for occupational training and parental occupation, were also deleted because the coefficients did not converge with these variables within twenty iterations. It is important to note that deletions of variables should not be considered as necessarily implying that the deleted variables are theoretically unimportant. Because of the overlapping condition in nonlinear estimations (see Nerlove and Press (1973)), frequently the coefficients fail to converge. To illustrate, all minorities in our sample except one person who enlisted in the military said they would like to receive some kind of occupational training. In this case, since this variable defines the choice, it does not provide any extra information. Thus, numerically an infinite value may be assigned to the coefficients. However, this case is usually not a problem for linear estimation because the variance-covariance matrix will not be singular even though one right hand side variable dictates the left hand side variable. The training variable showed a positive coefficient with a t-value of 1.6 on military enlistment when the estimation was made using the ordinary least squares technique.

²⁷One possible explanation may be that severe collinearity among the various explanatory variables occurred due to limiting sample selection to high school

Table 1.4 Multiple Choice Logit Estimations: Minority Male 1978 High School Graduates^a

Independent variable	College/Military	Other/Military	Other/College
Constant	-1.615 (-0.36)	10.203** (2.50)	11.828** (4.24)
Parental education	-0.0794 (-0.52)	-0.0277 (-0.18)	0.0517 (0.61)
Home environment at 14	0.137 (0.18)	0.454 (0.60)	0.316 (0.70)
Siblings	-0.102 (-0.79)	0.0835 (0.70)	0.186 (0.36)
Single parent family	0.869 (1.14)	0.667 (0.88)	-0.202 (-0.46)
Ability measure	-0.143 (-0.75)	-0.233 (-1.24)	-0.0903 (-0.88)
Educational aspirations	0.507** (2.23)	-0.258 (-1.31)	-0.765** (-4.96)
Unemployment rate	-0.152 (-1.03)	-0.183 (-1.28)	-0.0317 (-0.33)
Discrimination	-0.400 (-0.56)	-0.466 (-0.67)	-0.0662 (-0.15)
South	-0.743 (-0.75)	-0.590 (-0.62)	0.153 (0.25)
Black	-0.871 (-0.96)	-1.397 (-1.56)	-0.526 (-1.12)

^a Numbers in parentheses represent asymptotic t-statistics.

**Significant at the .025 level, one-tailed test.

aspirations and activity choices: individuals with higher educational desire are more likely to attend college than to engage in the other activities, but those who have high educational aspirations and do not go to college are more likely to prefer joining the military to remaining in the civilian sector. The other variables do not show statistically significant effects.

IV. Predicted Probabilities and Partial Derivatives

So far we have focused only on the behavioral relationships between certain individual characteristics and the probability of participating in a certain activity. Now we will estimate the probability of young men with certain characteristics making the choice of college, military service, or the civilian labor market and see how these probability estimates differ among

graduates. The high school diploma, which we used as a criterion for sample selection, may be a better success indicator for minorities than for whites, and in this respect, the minority group in our sample may be more homogeneous than the whites. Thus, there might be higher intercorrelation among various right hand side variables for this minority group. Also smaller sample size indicates that test statistics are less powerful for this group. In order to examine the overall explanatory power of the multiple logit equations, we computed the pseudo- R^2 s for both white and minority groups (see Nerlove and Press (1973) for the computation methodology of this statistic). According to the pseudo- R^2 , the overall fit of the estimations was the same between the two sets of equations (pseudo- R^2 : 0.0387 for whites and 0.0380 for blacks). Thus we suspected that the low significance of the coefficients for minorities might be due to severe multicollinearity among the explanatory variables. Farrar-Glauber statistics (see Farrar and Glauber (1967)) indicated only that some degree of multicollinearity exists for both white and minority equations but it did not show the degree of multicollinearity. Therefore, we regressed each independent variable against all other independent variables and compared resulting R^2 s to inspect the degree of correlations among all independent variables. The first number represents R^2 s for white equations and the second one for minority equations: Sibling (0.095, 0.237), Parental Education (0.359, 0.435), Ability (0.120, 0.193), South (0.212, 0.516), Educational Aspirations (0.246, 0.164), Local Labor Market Conditions (0.177, 0.499), Discrimination (0.017, 0.121), Single Parent Family (0.046, 0.096), Environment (0.162, 0.223). For the above computations, three more variables, parents in military, parental occupation and training, were included for both races and a dummy for blacks was also added for minority equations. The above statistics clearly support our contention that multicollinearity was a more serious problem for minorities than for whites.

young men with slightly different characteristics. For example, suppose that a military recruiter must choose to concentrate his recruiting in one of two different locations with similar potential recruits. In this case, efficient allocation of his budget and time resources will be attained if he understands the probable effects of labor market conditions on the enlistment decision.

For the computations of probability estimates and partial derivatives, three hypothetical high school graduates were configured.²⁸ In terms of socioeconomic status, ability measure, and educational aspirations, the characteristics of person A are below the mean values of his race group, those of person B are about the same as the mean values, and those of person C are above the mean values. Our earlier findings lead us to expect that the enlistment probability of C would be substantially lower than those of A and B. In order to make the predicted probabilities of joining the armed forces realistic, we assign higher than mean race-specific unemployment rates to C and lower than mean rates to A. The assigned characteristics of each hypothetical person are presented in Table 1.5.

White Males Table 1.6 presents probability estimates for each hypothetical person and the partial derivatives attributable to a unit increase in the specific explanatory variable when all other variables are held constant. A is more likely to pursue civilian activities than to attend college or join the armed forces. He has a 4 percent probability of

²⁸Unlike ordinary least squares estimation, our estimation procedure was nonlinear, so the first derivatives are not assumed to be constant. In other words, the effect of a unitary change in a given explanatory variable on the choice of activity is dependent upon the values where the derivatives are evaluated in terms of both the specific independent variable and all other explanatory variables. This statement is true because our estimation technique constrains each dependent variable to lie between zero and one. Moreover, it further restricts the sum of the three predicted values of the dependent variables to be one. Due to the latter condition, the derivative of a particular variable also depends upon the values of other variables.

Table 1.5 Characteristics of Three Hypothetical Male High School Graduates, by Type and Race

Characteristic \ Type	White			Minority		
	A	B	C	A	B	C
Parental education-years	11	13	16	10	12	14
Siblings	6	4	2	8	6	4
Ability measure	6	7	8	4	5	7
Educational aspirations-years	12	15	16	12	15	16
Unemployment rate-percent	3	4.6	6	6	10.8	15
Parental occupation	0	0	1	0	0	1
Environment	0	1	1	0	1	1
Single parent family	1	0	0	1	0	0
Parent in military	0	0	0			
Training	1	1	1	1	1	1
Discrimination	0	0	0	1	1	0
South	0	0	0	0	0	0
Black				1	1	1

Table 1.6 Predicted Probability Estimates for Each Activity and Partial Derivatives
Corresponding to a Unit Change in a Selected Explanatory Variable: White
Male 1978 High School Graduates

Activity Estimates Characteristics	Military		College		Other	
	Partial deriva- tives	Change in probability ($\Delta\hat{p}/\hat{p}$), %	Partial deriva- tives	Change in probability ($\Delta\hat{p}/\hat{p}$), %	Partial deriva- tives	Change in probability ($\Delta\hat{p}/\hat{p}$), %
Individual type A						
Predicted prob. (\hat{p})	.0421		.0260		.9319	
Parental educ. ($\Delta\hat{p}$)	.0010	2.5	.0004	1.5	-.0014	-0.2
Siblings ($\Delta\hat{p}$)	.0075	17.9	-.0037	-14.3	-.0038	-0.4
Ability measure ($\Delta\hat{p}$)	.0009	2.2	.0029	11.1	-.0039	-0.4
Educ. aspirations ($\Delta\hat{p}$)	.0218	51.9	.0247	94.9	-.0465	-5.0
Unemployment rate ($\Delta\hat{p}$)	.0093	22.2	-.0047	-15.0	-.0045	-0.5
Individual type B						
Predicted prob. (\hat{p})	.1153		.2479		.6368	
Parental educ. ($\Delta\hat{p}$)	.0021	1.8	.0025	1.0	-.0046	-0.7
Siblings ($\Delta\hat{p}$)	.0229	19.9	-.0314	-12.7	.0085	1.3
Ability measure ($\Delta\hat{p}$)	-.0005	-0.4	.0204	8.2	-.0199	-3.1
Educ. aspirations ($\Delta\hat{p}$)	.0234	20.3	.1344	54.2	-.1578	-24.8
Unemployment rate ($\Delta\hat{p}$)	.0288	25.0	-.0405	-16.3	.0118	1.9
Individual type C						
Predicted prob. (\hat{p})	.0539		.6827		.2635	
Parental educ. ($\Delta\hat{p}$)	.0006	1.1	.0028	0.4	-.0035	-1.3
Siblings ($\Delta\hat{p}$)	.0157	29.1	-.0401	-5.9	.0243	9.2
Ability measure ($\Delta\hat{p}$)	-.0027	-5.0	.0226	3.3	-.0199	-7.6
Educ. aspirations ($\Delta\hat{p}$)	-.0046	-8.5	.1174	17.2	-.1129	-42.9
Unemployment rate ($\Delta\hat{p}$)	.0203	37.7	-.0529	-7.8	.0324	12.3

enlisting, a 3 percent probability of attending college, and a 93 percent probability of remaining in the civilian sector. Substantial differences are found in the probability estimates between young men of types A and B. The probability of B (who has average characteristics of his race) enlisting in the armed forces is 12 percent, about three times that of A. Although the probability of B attending college is higher than for A, B is still very likely to do something else.²⁹ As expected, C is more likely to enroll in college, because he was above average in terms of ability, family background, etc.

Table 1.6 presents the partial derivatives showing how the probability of participating in various activities would change with a unit change in a particular exogenous variable, given that all other variables remain the same as assigned in Table 1.5. Note that in every case there are zero-sum compensatory changes in the partial derivatives. For example, for A, if the unemployment rate is five percentage points higher, his probability of enlistment increases by about 5 percentage points (or 111 percent), while his probabilities of attending college and remaining in the civilian sector simultaneously decrease, respectively, by about 2.5 percentage points each (or 75 percent and 2.5 percent, respectively).

²⁹There is no reason to expect that the mean value of the right hand side variable in a nonlinear estimation crosses the mean value of the left hand side variable. Furthermore, the 25 percent probability of individual B enrolling in college should not be taken to show the mean college enrollment rate, which was 46 percent in our sample. This apparent contradiction arose because we ignored the effects of various dummy variables in this computation; the focus was on the effects of the continuous variables. Although assigning the mean values even for these qualitative variables may produce probability estimates which are closer to the population mean, we did not assign the mean value of the sample because by definition, no person was supposed to have values other than one or zero for the case of qualitative variables. It should be emphasized that the focus here is not on the estimation of the mean values, but on the examination of behavioral relationships for very specific persons.

The enlistment probabilities of A are substantially affected by educational aspirations and are moderately affected by unemployment rate and the number of siblings. The likelihood of such a person's enrolling in college is affected only by the educational aspiration variable. For B, labor market conditions has the largest impact on military enlistment while educational aspirations and the number of siblings are the next two most influential variables. It is also interesting to find a high cyclical sensitivity for C with respect to enlistment decisions. In terms of rates of change, C is shown to be much more responsive to labor market conditions than the other two. His likelihood of enlisting is also strongly affected by the number of siblings.

Minority Males Two differences were found between whites and the minority group, both related to enlistment decisions (Table 1.7). First, whereas the enlistment probabilities for B were higher than for A and C for whites, the pattern is somewhat different for minorities. The probability of enlistment increased monotonically from A to C, thus indicating that ability measures and socioeconomic status favorably affect the enlistment decision among minorities. However, the low predicted probability of enlisting (1.3 percent) for A is surprising, particularly considering that enlistment of this quality group (high school diploma graduates) is known to be supply-determined.

Second, as in the case of whites, labor market conditions have a substantial effect on enlistment decisions. In terms of absolute percentage changes, minorities show similar patterns; however, unlike the case for whites, among minorities the probability of A joining the armed forces increases more than that for C due to one percentage point increase in

Table 1.7 Predicted Probability Estimates for Each Activity and Partial Derivatives
Corresponding to a Unit Change in Selected Explanatory Variable: Minority
Male 1978 High School Graduates

Activity Estimates Characteristics	Military		College		Other	
	Partial deriva- tives	Change in probability ($\Delta \hat{p}/\hat{p}$), %	Partial deriva- tives	Change in probability ($\Delta \hat{p}/\hat{p}$), %	Partial deriva- tives	Change in probability ($\Delta \hat{p}/\hat{p}$), %
Individual type A'						
Predicted prob.(\hat{p})	.0132		.0351		.9517	
Parental educ. ($\Delta \hat{p}$)	.0004	3.0	-.0018	-5.1	.0014	0.2
Siblings ($\Delta \hat{p}$)	-.0010	-7.6	-.0058	-16.5	.0067	0.7
Ability measure ($\Delta \hat{p}$)	.0034	25.8	.0030	8.6	-.0064	-0.7
Educ. aspirations($\Delta \hat{p}$)	.0032	24.2	.0371	105.7	-.0403	-4.2
Unemployment rate($\Delta \hat{p}$)	.0026	19.7	.0010	2.9	-.0036	-0.4
Individual type B						
Predicted prob.(\hat{p})	.0941		.2413		.6646	
Parental educ. ($\Delta \hat{p}$)	.0036	3.8	-.0099	-4.1	.0063	1.0
Siblings ($\Delta \hat{p}$)	-.0031	-3.3	-.0306	-12.7	.0337	5.1
Ability measure ($\Delta \hat{p}$)	.0194	20.6	.0109	4.5	-.0302	-4.5
Educ. aspirations($\Delta \hat{p}$)	-.0007	-0.7	.1562	64.7	-.1555	-23.4
Unemployment rate($\Delta \hat{p}$)	.0161	17.1	.0013	0.5	-.0174	-2.6
Individual type C						
Predicted prob.(\hat{p})	.1766		.4665		.3569	
Parental educ. ($\Delta \hat{p}$)	.0084	4.8	-.0151	-3.2	.0068	1.9
Siblings ($\Delta \hat{p}$)	.0025	1.4	-.0392	-8.4	.0367	10.3
Ability measure ($\Delta \hat{p}$)	.0278	15.7	.0018	0.4	-.0296	-8.3
Educ. aspirations($\Delta \hat{p}$)	-.0327	-18.5	.1649	35.4	-.1322	-37.0
Unemployment rate($\Delta \hat{p}$)	.0252	14.3	-.0081	-1.7	-.0172	-4.8

unemployment rates.³⁰

V. Summary of Findings and Policy Implications

This study developed an activity choice model for youth based upon the 1979 NLS Youth Cohort data. Our basic question was, Why do some youth decide to enlist in the armed services, while other youth choose to invest in education or pursue other civilian activities? The universe of analysis consisted of males who were graduated from high school with a diploma between May and December, 1978. Since the choices were assigned qualitatively, each individual's probability of choosing an activity was estimated using the multiple logit estimation technique, which satisfies the two conditions that each dependent variable should lie between one and zero, and that the sum of the three dependent variables should equal one.

We disclosed some new findings and also confirmed some conventional expectations about the characteristics of the enlistees and college enrollees. Our findings confirm the sensitivity of military enlistment by white males to labor market conditions: military service was favored over college and other civilian pursuits as the labor market conditions deteriorated. More interesting is our finding that the effects of the labor market conditions on the likelihood of joining the armed services were even higher for both white and minority young men who are above average in terms of ability and socioeconomic status than for those who are below average. We

³⁰Finally, a caveat is in order. When a behavioral model is based upon a micro data set, the predictability of the model is frequently very low because disaggregation typically raises the importance of accidental factors and thus lowers the total explanatory power. Considering that we not only used individual observations as a basis of our analysis, but we also applied a constrained estimation technique by which all three qualitative dependent variables were interrelated, the impact of any accidental factor or omitted variable might have been significant.

also confirmed the conventional expectations about the characteristics of enlistees: individuals whose parents are white-collar workers are more likely to enroll in college and less likely to enlist in the armed forces; individuals who have more siblings are less likely to attend college, but more likely to join the military.

Individuals who desire to complete higher education obviously are more likely to attend college. Among those who were not going to college, those who had higher educational aspirations preferred military service to other civilian alternatives. The fact that post-service educational benefits are available for those who fulfilled their requirements in the military service, together with our finding that enlistees have higher educational aspirations than their civilian counterparts (other than college enrollees) should not be construed as necessarily implying that the enlistees will participate in programs such as the Veterans Educational Assistance Program (VEAP) to qualify for the benefits. Although the issue may be an empirical question to a certain extent, the participation rates in such a program may be somewhat lower than anticipated because the net returns from investment in education are inversely related to age on both the supply and demand sides. From the supply side, the price of schooling will be higher for an older person than for a younger person due to higher foregone earnings; and on the demand side, the returns over the life cycle will be smaller for the older person than the younger person due to the shorter length of time remaining to receive them. Therefore, although the motivation for enlistment might have been seriously affected by the availability of educational benefits, unless the respondents have specifically calculated the costs and returns to the education investment, it is not likely that after three or four years of military service all those young men who initially expected to return to school will do

so. At least it is understandable why the percentage who actually do go back to school may be lower than the percentage who planned to when they enlisted.

The conventional argument that one of the primary motivations for many youths to participate in the armed services is to escape from their troublesome familial relationships was not supported in our analysis of high school graduates. Our analysis also indicates that Southerners relative to non-Southerners show higher preference for military service than for nonmilitary activities, with college the least preferred choice. However, the hypothesis that those who think race, sex, or age discrimination operates in the labor market have higher probabilities of joining the armed services was not supported.

A major finding of the analysis is that white male graduates who desire to obtain some occupational or on-the-job training are more likely to enlist in the armed forces than to remain in the civilian sector. This result suggests that many white youth view service in the military as a means of obtaining some skills which might be transferable to their future civilian life, a result which has a significant policy implication. We have shown that individuals with higher educational aspirations were more likely to enlist in the armed services than to participate in civilian activities. Also individuals with a large number of siblings, who might have some difficulties in obtaining financial support for higher education from their parents, were shown to have higher probabilities of joining the armed forces. Therefore, we can speculate that individuals who have higher educational aspirations but can not afford to achieve them are more likely to choose the military service than to pursue civilian activities. In the past, the relatively higher educational aspiration of the enlistees has been frequently referred to as a rationale for recommending use of post-service educational benefits as a means to recruit

highly qualified personnel. However, our finding implies that occupational training programs other than regular schooling may be just as attractive to the enlistees. Military educational benefits may be extremely important to a small number of potential recruits but not very important to most. The NLS data indicate that among high school graduates, only about 15 percent were participating in the VEAP program in 1979. Because the desire for occupational training variable is qualitative, we cannot compute the cross-elasticities between the receipt of occupational training and educational aspirations. However, the strong performance of the training variable implies that these individuals might consider occupational training or on-the-job training as a reasonable substitute for their probably unachievable high educational aspirations. This result suggests the wisdom of promoting in addition to post-service educational benefits the availability of occupational training and its transferability to civilian employment.

Furthermore, if policy makers have some information about the characteristic distribution of the population, they can concentrate recruiting efforts on areas with high unemployment rates to help achieve manpower requirements.

Appendix I.A Mean Values and Coefficients of Variation (CV) for Selected Explanatory Variables by Activity and Race: 1978 Male High School Diploma Graduates^a

	Military		College		Other	
	Mean	C.V.	Mean	C.V.	Mean	C.V.
Parental occupation						
White	.28	1.61	.70	.66	.35	1.37
Minority	.39	1.25	.37	1.30	.14	2.43
Home environment at 14						
White	.48	1.04	.73	.60	.54	.93
Minority	.43	1.16	.43	1.14	.36	1.33
Broken home						
White	.24	1.79	.11	2.82	.18	2.17
Minority	.40	1.23	.45	1.11	.38	1.29
Parents in military						
White	.19	2.05	.02	7.00	.02	7.50
Minority	.03	6.00	.00	-	.05	4.40
Training						
White	.88	.38	.50	1.00	.78	.54
Minority	.90	.33	.67	.70	.84	.44
Discrimination						
White	.33	1.42	.37	1.30	.33	1.42
Minority	.52	.96	.53	.94	.51	.98
South						
White	.23	1.83	.23	1.83	.19	2.05
Minority	.73	.62	.42	1.17	.55	.91

^aSee footnotes in Table 1.2.

Appendix I-B: Theoretical Bases

The theory of consumer choice is the basis of the activity choice model. A decision maker is assumed to behave rationally; that is, an individual chooses from all available alternatives the one which he considers most desirable, given his tastes and all the relevant constraints. The "most desirable" alternative is presumed to maximize the individual's well-defined utility function. To be well defined the utility function must be continuous, twice differentiable, and (strictly) quasi-concave. We will utilize the strict quasi-concave assumption to indicate that no two choices provide an equal amount of utility. This assumption is needed because we will have pairwise mutually exclusive alternatives. That is, individuals are assumed to choose one and only one alternative.

In principle, the theory of individual utility maximization is sufficient to explain the rational behavior of individual choice. To start, assume that an individual has a utility function, $U = U(c, x)$, where c is a vector of alternatives (choices), and x is a vector of observed characteristics of other variables. Of course, an individual will try to maximize his utility function subject to the constraint that $c \in A$, where A is a set of alternatives. By solving this constrained maximization, we will have a conventional demand (for activity choice) function, $c = c(A, x)$. The issues of unobserved characteristics, measurement error, tastes, and choice under uncertainty are not discussed here. All these issues are somewhat interrelated but incorporating them would make the model specification extremely complicated and is beyond the scope of this paper.

First, in order to devise a computationally feasible econometric model to estimate the above activity choice equation, a theoretical assumption of "separability of preferences" is introduced. Conceptually, this assumption of

the separation of decision is not implausible because it hypothesizes that the individual behaves "as if" his preferences satisfy a myopic decision rule to economize on information costs. Second, the multiple choice selection process assumes an "independence of irrelevant alternatives" to make the complex estimation procedure more simplistic; this assumption implies that the relationships between any two choices (i.e., the preference ordering between the two alternatives) do not change in the presence of other alternatives. For a detailed theoretical discussion, see Domenich and McFadden (1975). One of the merits of the above independence assumption is that it saves a lot of computing time and cost in the case of multiple choice selections. An introduction of a new alternative will not change any existing relationship among the alternatives. However, this strength of the assumption can also be viewed at the same time as a drawback. In reality, some alternative choices can be complementary to each other. Therefore, the existing relationship regarding the preference ordering of the alternatives can be affected and changed by the introduction of a new alternative.

According to basic human capital theory, the individual choosing among available activities will consider the difference between the expected pecuniary and nonpecuniary returns over his life-cycle if he chooses a certain activity and the expected returns from making an alternative choice. Under ideal circumstances where the market information is perfect and the market system is functioning efficiently, the theory implies that the expected returns from choosing two different alternatives would be the same. Likewise, under these circumstances, the expected returns of two individuals with similar characteristics would be the same over their life-cycles. However, because both the capital market and the information system are imperfect, and because demand and supply conditions affecting human capital investment are,

to a certain extent, interrelated, choice of a certain activity could yield different life cycle patterns for similar individuals. (For more extensive discussions about the joint distributions of supply and demand, see Becker, 1975.) Furthermore, if individuals have different subjective discount rates, then even identical future streams of expected returns in nominal terms may produce different life cycle patterns.

Chapter II

The Supply of Potential Armed Forces Personnel: A Cross-Section Study of Intentions to Enlist in the Military Service Among Male Youth Who Have Never Served

Maintaining the desired size of the armed forces and attracting as many high ability individuals as possible are conflicting constraints in recruitment. Sustaining "quality" personnel within the AVF system is the major theme of this chapter. This issue is particularly relevant now. The age structure of the population has changed: the relative size of the youth cohort has become smaller, and even its absolute size has begun decreasing. The 17 to 21 year old male population will decrease by 2.6 percent between 1979 and 1982, and by 11.1 percent by 1985. Therefore, if all else stays constant, steady enlistment rates imply reduced armed forces size. Further, a significantly different population growth pattern is indicated for whites and nonwhites:¹ between 1979 and 1985, the population of young white males age 17 to 21 will decrease by 12.9 percent, but the comparable black population will decrease by only 1.2 percent. Moreover, the white population has already begun decreasing, while the black population will not decline until after 1982.²

This study examines the factors which lead young men to enlist in the armed forces. Specifically, we will ask: Do minorities regard the military service as a better alternative than whites do? Are young men from lower

¹This population is based upon the projections by the Bureau of the Census. See Current Population Report (1979). Blacks constitute approximately 90 percent of nonwhite groups.

²Another important factor affecting the eligible enlistment pool size is the variation in college enrollment rates. Its effect on the high quality recruitment pool is particularly significant because military jobs are generally considered only as alternatives for civilian employment and not as substitutes for college education.

socioeconomic status backgrounds more likely to intend to join the armed forces than those from higher socioeconomic status backgrounds? Is military service more attractive to those who expect to attain fewer years of schooling than they would like? Does labor market experience--e.g., unemployment--have a significant impact on intention to enlist?

The plan of this chapter is as follows. Analytical framework and descriptive statistics are introduced in Section I. Empirical estimations of positive intentions to enlist for each race group and high school seniors are reported in Section II. Section III discusses partial derivatives of enlistment intentions. A summary of findings and policy implications are contained in the final section.

I. Analytical Framework and Descriptive Statistics

This study uses the nationally representative NLS data set. Because the armed forces are still predominantly male, the sample for this study is limited to young men. We divided 14 to 21 year old males into the following three mutually exclusive universes, each stratified by race: those 14-17 years old excluding high school seniors, those 18-21 years old excluding high school seniors, and high school seniors. All three universes exclude those who have served or are serving in the armed forces.

The division into these three universes was based upon the rationale that the intentions to enlist in the armed forces of those three different groups have varying implications for military manpower policies. For example, the first universe provides a longer run perspective on the potential aggregate enlistment supply and also provides information on how the preference for the military service might change over the next five years. The second universe, who are age-eligible, represent the currently available manpower pool for

enlistment. However, a majority of the people in this age category who were going to enlist have already participated in the armed forces, so their characteristics might be significantly different from the younger age cohort.³ (We will explore these possible differences in a later section.) Probably most important for military authorities to understand is the third group--high school seniors. Since the high school senior year is a common time for a young man to make his first major career choice, his intention at this time should be a strong indicator of his actual choice after leaving school. Particular emphasis will be placed on analysis of this universe.

The dependent variable throughout this analysis is binary, where 1 indicates those who specifically said that they would definitely or probably try to enlist in the armed services in the future, and 0 indicates all others. Table 2.1 presents the proportion with positive intentions to enlist for different groups.⁴

Among the 14.6 million male youth age 14 to 21 who have not served in the military, 3.6 million or about 25 percent said that they would try to enlist in the future.⁵ Discernible race and age effects were found: the intention

³Needless to say, the 18 to 21 year old cohort is, to a certain extent, a censored sample: except for those who could not pass the tests, those who have strong positive intentions to serve have already joined the armed forces. However, because the purpose of this analysis is not to estimate the unbiased coefficients of the original cohort, but to examine the characteristics of those who remain in the civilian sector but have positive intentions, the statistical problem due to a censored sample is not relevant in this study.

⁴Since the NLS data set is nationally representative, individuals in the data set have their own sampling weights, which are the inverses of the probabilities of being selected. For the computations of the population means, we used these sampling weights to make our sample estimates representative of the population estimates.

⁵The intended enlistment rate of 25 percent appears to be a little too high since only about 7 percent of male youth age 18-21 are currently serving in the armed services. However, considering that about half of the applicants

Table 2.1 Proportion with Positive Intentions to Enlist Among Male Youth Who Have Never Served, by Age and Race: 1979^a (in thousands)

Race	Age 14-17, non-high school seniors	Age 18-21, non-high school seniors		High school seniors	
	Population	Positive intentions	Percent	Population	Percent
Black	1,020 ^b (694)	463 (325)	45.4	698 (428)	27.4
Hispanic	496 (452)	238 (220)	48.0	294 (257)	21.8
White	5,535 (1,440)	1,854 (510)	33.5	4,970 (1,085)	9.8
Total	7,051 (2,586)	2,553 (1,055)	36.2	5,962 (1,790)	12.5
				217 (155)	78 (60)
				82 (79)	27 (26)
				1,313 (283)	240 (57)
				1,612 (617)	344 (143)
					35.9
					32.9
					18.3
					21.3

^a In NLS data, each respondent has a differential weight which is an inverse to the probability of being selected. This sampling weight is introduced in these computations in order to represent the population estimates.

^b Numbers in parentheses represent unweighted cell sizes.

rates of 14-17 year olds were about three times those of 18-21 year olds, while the rates for the high school seniors were in the middle. The lower enlistment intention rates for the older age group (18-21 year olds) is not surprising because about 10 percent of that age cohort have already joined the armed services. Across all age groups, the intention rates of whites were substantially lower than those of blacks and Hispanics.⁶ Because minorities will make up an increasing proportion of the youth population in the next decade, their enlistment propensities suggest that they may constitute an increasing proportion of the armed services.

Table 2.2 (and Appendix Table II-A) compares the characteristics of the individuals who intend to volunteer for the armed forces with those who do not. Since the effects of each characteristic on the enlistment decision using multivariate regression will be presented in a later section, here we will discuss only briefly the expected relationships and describe the raw statistics.

We expect that an individual with a large number of siblings is more likely to intend to enlist than an individual with fewer siblings,⁷ primarily because people from larger families are less likely to go to college due to the strain on family finances.⁸ Indeed, across all race and age groups, the

fail mental or physical examinations, and that 3 percent of all civilians of this age group have participated in the military services (so a total of 10 percent have served in the armed forces, while another 10 percent might have failed the tests), the enlistment intention rate reported here is thought to belong within the reasonable boundary of the expected estimates.

⁶The proportion of Hispanic 14-17 year olds intending to enlist was higher than for blacks. Blacks in the other two groups had higher intention to enlist rates.

⁷For an explanation of seemingly high mean values of the number of siblings, see footnote 17 in Chapter I.

⁸See, for example, Lindert (1977).

Table 2.2 Comparisons of Mean Values and Standard Deviations for Selected Characteristics Among Male Youth Who Have Never Served, by Age, Race, and Intentions to Enlist^{a,b}

Characteristics	Age 14-17, non-high school seniors			Age 18-21, non-high school seniors			High school seniors		
	Black	Hispanic	White	Black	Hispanic	White	Black	Hispanic	White
Number of siblings									
Positive	5.67 (3.03)	5.56 (2.90)	4.04 (2.24)	6.27 (3.05)	5.86 (2.69)	4.12 (2.11)	5.55 (2.44)	5.51 (3.20)	4.15 (1.94)
Negative	5.38 (2.77)	5.40 (3.01)	3.84 (1.83)	5.06 (2.86)	5.13 (2.83)	3.94 (1.95)	5.32 (2.56)	5.39 (3.00)	3.76 (1.61)
Parental education									
Positive	11.20 (2.37)	8.81 (4.12)	12.40 (2.70)	11.30 (2.53)	8.10 (3.95)	12.55 (2.69)	11.22 (2.38)	10.68 (3.75)	12.06 (2.74)
Negative	11.82 (2.43)	10.31 (4.49)	13.09 (2.88)	11.70 (2.78)	9.99 (4.48)	13.17 (2.85)	12.06 (2.41)	10.35 (4.20)	13.71 (2.76)
Educational attainment									
Positive	8.52 (1.22)	8.56 (6.02)	8.48 (1.50)	11.26 (1.00)	11.25 (1.17)	11.81 (1.00)	^c	-	-
Negative	8.46 (2.00)	8.52 (1.48)	8.64 (1.91)	11.89 (1.11)	11.96 (1.06)	12.21 (0.96)	-	-	-
Educational discrepancy									
Positive	0.75 (1.45)	0.64 (1.32)	0.64 (1.34)	0.91 (1.43)	0.56 (1.04)	0.74 (1.31)	0.73 (1.49)	0.23 (1.02)	0.41 (1.00)
Negative	0.53 (1.27)	0.72 (1.34)	0.53 (1.17)	0.68 (1.15)	0.62 (1.23)	0.53 (1.14)	0.41 (1.10)	0.55 (1.12)	0.37 (0.96)
Ability measure									
Positive	4.06 (1.74)	4.20 (1.80)	5.32 (2.01)	4.89 (1.85)	5.33 (2.01)	6.74 (1.94)	4.59 (1.98)	5.62 (1.45)	6.35 (1.63)
Negative	4.42 (1.87)	4.74 (1.90)	5.81 (1.95)	5.69 (2.03)	6.10 (2.21)	7.27 (1.74)	5.14 (1.81)	5.47 (2.42)	6.76 (1.74)
Internality									
Positive	9.28 (2.29)	9.47 (2.27)	8.90 (2.38)	8.98 (2.38)	8.51 (2.04)	8.77 (2.42)	8.58 (2.39)	8.80 (2.49)	8.37 (2.59)
Negative	9.00 (2.29)	9.43 (2.27)	8.66 (2.18)	8.44 (2.41)	8.47 (2.59)	7.85 (2.40)	7.88 (2.42)	8.62 (2.53)	8.03 (2.26)
Unemployment rate									
Positive	10.19 (3.25)	11.09 (2.76)	4.58 (1.20)	10.14 (2.80)	11.00 (2.59)	4.55 (1.14)	9.24 (2.67)	11.26 (3.28)	4.95 (1.32)
Negative	10.82 (3.12)	11.22 (2.68)	4.51 (1.16)	10.95 (3.24)	10.72 (2.46)	4.53 (1.31)	11.05 (3.10)	11.41 (2.33)	4.52 (1.12)

^aNumbers in parentheses represent the standard deviation.

^bThe mean values and standard deviations of other variables are presented in Appendix II-A.

^cBy definition, high school seniors have attained 11 years of education.

mean value of the number of siblings for those who intend to volunteer for the armed forces turned out to be higher than for those who would not.

It has long been suspected that armed forces personnel come primarily from groups with lower socioeconomic status,⁹ because these groups have fewer opportunities for schooling and work in the civilian sector. It has been also suggested that the educational attainments and intellectual ability of people who intend to join the military are lower than those of their civilian counterparts: such individuals were thought to try to join the armed forces because of their inability to find civilian employment.

As a proxy for the socioeconomic status of the respondents, educational attainment of parents was chosen. Except for the group of Hispanic high school seniors, the mean value of parent's years of schooling was indeed lower for those who said they intend to join the armed forces than for those who said they do not. We find the same pattern for the respondents' educational attainments except for 14 to 17 year old minority males--a lower mean value for those who intend to join than for those who do not. However, the higher socioeconomic status and the educational attainment of those who do not have positive intentions probably reflect the fact that many of those who do not intend to enlist are college bound.¹⁰

⁹See U.S.G.P.O. (1970).

¹⁰The ideal universe for this analysis should exclude those individuals who definitely want to go on to college because it is unlikely that these individuals regard the military service as a substitute for a college education. They were not excluded from our analysis because their exclusion cannot be made without substantial measurement errors and because many youth in the past have said that the primary purpose of joining the armed services was to take advantage of the post-service educational benefits. Although it is an empirical question how many actually volunteer for the armed forces for the purpose of getting the post-service educational benefits, since they are theoretically conceivable, we decided to leave potential college bound youths in our sample. In Appendix II-B and II-C, we present the results where the universe is restricted to exclude some of the youths who said that they

Military service has frequently been cited as a means of obtaining post-service educational benefits. In order to examine the significance of this factor in enlistment decisions, a variable was constructed to show the number of years' difference between desired and expected educational attainment. Basically, this variable captures whether or not individuals who anticipate rather limited opportunities to achieve their desired educational goals are more likely to join the armed forces. We expect a positive relationship.

Generally our expectations turned out to be correct. For both white and black male youths in the three age groups, the mean values of the number of years difference between desired and expected education was higher among those who show positive intentions than among those who do not. However, the reverse pattern appears among the three groups of Hispanic males: for them, the mean values of the difference between desired and expected years of education are smaller for those who intend to enlist than for those who do not.¹¹

Two additional variables investigated in this sample are the knowledge of the world of work (KOWW) score and the Rotter score.¹² Since a large expected to attain college graduate degrees.

¹¹The interpretation of this variable needs to be qualified. If the (possible) use of post-service educational benefits is already taken into account in the expected years of education, then the variable should be regarded as endogenous rather than exogenous. However, since the dependent variable represents an enlistment intention rather than enlistment behavior, the simultaneity issue may not be directly relevant.

¹²The KOWW score measures an individual's degree of labor market information about occupational descriptions. Since the NLS data currently do not have good measures for individual ability, this variable is also used as a proxy for IQ measures. Previous studies show that this variable is highly correlated with individual ability and knowledge. See Parnes and Rich (1980) and Griliches (1976). Rotter score is expected to capture internal/external locus of control of individuals (i.e., the degree to which one feels in control of one's own outcomes): a low score indicates more internal characteristics while a high score indicates more external characteristics. For a detailed description and interpretation of this variable, see Appendix F

proportion of those who do not intend to enlist in the armed forces are college bound, we expect that the KOWW scores are lower for those who intend to join the armed forces than for those who do not. As expected, the mean KOWW scores for those with positive intentions were lower than for those with negative intentions, except for the Hispanic high school senior group.

We also find that those youths who intend to enlist have, on the average, more external locus of control (i.e., higher mean scores of Rotter) than the youths who do not intend to enlist. In other words, youths who believe they have control over their future life, by and large, are more likely to pursue civilian activities such as attending college and/or working in the civilian sector, while youths who think they have less control over their future are more likely to intend to enlist in the armed services.

Race-sex specific state unemployment rates are used to capture the cyclical conditions across different labor markets. We expect these rates to capture the effects of job availability and to be higher, on the average, for those who intend to enlist than for those who do not. However, we find rather mixed results; the expected pattern appeared to hold only for the white groups and 18 to 21 year old Hispanic males, and even for these groups the relationship was not strong. We saw in Chapter I that labor market conditions did show a significant effect on actual choice for enlistment; their lack of effect here on plans for enlistment may reflect the fact that it is even easier to plan to move than to do it.

II. Logit Estimations for Positive Intentions to Enlist

We next present estimates of the enlistment intentions using logistic

equations by race and age groups. Our approach will be analytical, and we will focus on probability of enlistment intentions, given particular individual characteristics.¹³

The explanatory variables for the intention to enlist include family background attributes as measured by socioeconomic status, number of siblings, and parental status such as single parent family and parents in military; individual attributes such as ability test scores (KOWW), educational attainment, age, educational aspirations, internality score (ROTTER),¹⁴ desire for occupational training other than regular schooling, perceived discrimination in the labor market, labor market status (i.e., whether respondent is unemployed or not), duration of unemployment, and actual (or imputed) wage levels; labor market attributes such as unemployment rates in the state of residence; and other control variables such as the perceived opinions of significant others, marital status, and enrollment status.

Because the enlistment intention model is specified similar to the enlistment model, the expected signs of most of the above independent variables are the same as discussed in Chapter I. However, there are three new variables: unemployment duration, perceived opinion of significant others, and actual (or imputed) wage levels. Unemployment status and duration of unemployment are added to examine the hypothesis that military service is regarded as a last resort for employment. Some survey studies report that youths who feel that their relatives (or significant others) support their

¹³In contrast to the discussions in the previous section where the characteristics of the respondents with positive intentions were analyzed based upon crosstabular statistics, here we present logit estimates, first, to show the impact of each independent variable upon enlistment intentions and, second, to estimate the changes in enlistment intentions in probabilistic estimates due to a change in independent variables.

¹⁴For the rationale for including Rotter score, see footnote 12.

joining the service have higher probabilities of enlisting,¹⁵ thus, we include the perceived opinion of significant others to control for this effect. Finally, actual (or imputed) wages are used to investigate the effect of military pay relative to civilian wage on enlistment intention.¹⁶ The results of the estimated logit equations for each universe are presented below.

14 to 17 Year Old Males, Excluding High School Seniors

The estimated results by race are presented in Table 2.3 for the youngest age group. It was expected that their intentions to enlist are more heavily influenced by individual preference and family background rather than by rational perceptions of military service as an occupational choice to be compared to civilian alternatives.

In general, we find very discernible racial differences. The few common relationships are the impacts of educational attainment, family background, and the perceived opinions of significant others.¹⁷ Individuals from higher socioeconomic status segments of the population, as shown by parental education, are less likely to intend to enlist; younger youths who perceive that the person who has the most influence on them would approve their joining the armed services are more likely to intend to enlist; and young males who

¹⁵See, for example, Youth Attitude Tracking Study, Market Facts, Inc. (1979).

¹⁶The wage variable is included only in the equation for 18 to 21 year old non-high school senior youths.

¹⁷Initially all the explanatory variables discussed in the previous section were included in the estimations. However, the coefficients of some variables did not converge within twenty iterations. The severe collinearity among variables is considered the main reason for nonconvergence. For example, age and educational attainment are highly correlated for the young age group, and parental education and number of siblings are also closely associated. Thus, some variables whose coefficients did not converge within twenty iterations were deleted from the final estimations. For an illustration of the difficulty in non-linear estimation, see footnote 27 in Chapter I.

Table 2.3 Logit Estimations of Positive Intentions to Enlist: 14-17 Year Old Male Non-High School Seniors^a

Variable	Race					
	Coefficient		Black	Hispanic	White	
			Coefficient	t-stat.	Coefficient	t-stat.
Constant			1.4537	1.40	0.9339	0.83
Parental education			-0.0410	-1.09	-0.0564	-2.06**
Educational attainment			-0.2136	-2.31**	-0.0947	-0.85
Ability measure			-0.0433	-0.88	-0.0350	-0.54
Educational discrepancy			0.1113	1.70*	-0.0505	-0.62
Significant others			0.8030	4.29**	1.2670	5.64**
Internality (Rotter)			0.0444	1.16	0.0012	0.02
Training			0.3929	1.91*	0.4500	1.60
Single parent family			0.3434	1.97**	0.2297	1.02
In school in 5 years			-0.4704	-2.60**	-0.2356	-1.01
Enrolled			0.2647	0.76	-0.6360	-1.59
Not in labor force			-	-	0.5272	2.15**
Unemployment rate			-0.0505	-1.84*	-0.0092	-0.23
Weeks unemployed			0.0492	2.93**	0.0287	0.92
Log of likelihood function			-390.32		-243.82	
Sample size			618		396	
						1352

* Significant at the .05 level, one-tailed test.

**Significant at the .025 level, one-tailed test.

^aThose who have ever served in the military are excluded.

have attained higher levels of education are less likely to intend to enlist. These relationships were generally statistically significant,¹⁸ but two of them may need further clarification. First, as noted earlier, the lower socioeconomic status of those with positive intentions primarily reflects the higher socioeconomic status of college bound youths. Second, educational attainment may also capture the effect of age. In this young age group, except for the high school dropouts, age and grade in high school will be highly correlated. One possible explanation for why educational attainment (or age) has an inverse relationship with intentions to enlist is that teenagers narrow down their occupational choices more realistically as they become older. A 14 year old may perceive more choices open than a 17 year old youth.

For blacks age 14-17, the variables which capture the difference between the desired and expected years of schooling completed, the desire for obtaining occupational or on-the-job training, the expectation of being in school in five years, whether or not they lived with both natural parents at age 14, and the duration of weeks unemployed for the unemployed turned out to show some significant impact on positive enlistment intentions. Individuals who expect to complete fewer years of schooling than they want and those who desire some occupational training are more likely to intend to enlist. This result implies that youths who view the military service as a means of obtaining some particular skill or post-service occupational attainment are the ones who have positive intentions. Some blacks who have been unemployed for a long time also indicated positive intentions; this result shows that the military service is particularly favorably regarded among those who have had

¹⁸parental education was not a significant factor for blacks and educational attainment was insignificant for Hispanics.

some adverse labor market experiences.¹⁹ The single parent family variable, which indicates the respondent did not live with both of his natural parents at the age of 14, had a positive coefficient on intentions of black youth and was statistically significant. This finding could be interpreted as supporting the view that escape from troublesome familial relationships is one of the important motivations for enlistment.²⁰ Another interpretation would emphasize the perception of the military as a means of social mobility for youth from single parent families.

For Hispanic youths age 14-17, in addition to parental education and the view of a significant other, discussed above, the only other significant variable was that which indicates respondents are not in the labor force (NILF). This variable should be interpreted with the coefficient on the enrolled in-school variable; together they indicate that high school dropouts who are not working or seeking work are more likely to have positive intentions.²¹ This result is thus consistent with our finding that blacks who have had adverse labor market experience are also more likely to show positive intentions.²²

Among the younger white youths, the measure of individual ability and the

¹⁹It is likely that those who experience many weeks of unemployment among this young age group are high school dropouts. These persons may, in fact, not be acceptable to the services.

²⁰Gottlieb (1979) reported that a little more than half of the enlistees interviewed indicated that the major reason that they decided to enlist was to escape problems at home, parental conflict, etc. His study is based upon personal interviews with 115 Army enlistees.

²¹Not being in the labor market is, in a sense, natural for teenagers enrolled in high school, so the positive coefficient on the NILF variable is hard to interpret if the schooling status is not controlled for.

²²Although it is only marginally significant, the positive coefficient on the training variable indicates that, like black youths, Hispanic youths who desire occupational training have stronger intentions to serve.

labor market condition variable were significant, as were the commonly significant variables. The finding that individuals with higher ability are less likely to intend to enlist may also reflect that a large proportion of those with negative intentions are the college bound youths.²³ Interestingly, only whites showed the expected relationship between enlistment intentions and labor market conditions. The difference between whites and minority groups is that whereas personal experience of adverse labor market conditions was an important positive factor for intentions among blacks, perceived adversity in the labor market played an important role for whites.

In sum, we found some variables for enlistment intentions which cut across racial lines in this age group as well as race-specific variables that were significant. This group basically constitutes an eligible enlistment pool for the future. Intentions to enlist among this young age group may, however, merely represent their preference for the military service, because many youths at this age may not have very specific ideas about their careers.²⁴

18 to 21 Year Old Males, Excluding High School Seniors

This group is basically age-eligible for enlistment and thus constitutes the immediately available enlistment pool. However, it should be remembered

²³In fact, this result is consistent with the inverse relationship between the educational attainment and intentions because individual ability and educational attainment are highly correlated with each other. However, in our case, since the age effect could not be distinguished from educational attainment due to severe collinearity, we could not make such an inference.

²⁴Further, inclusion of the college bound youths in the sample and the assumption that for most youths a military job is an alternative to a civilian job rather than to attending college may have somewhat biased the coefficients, although there may not be an appropriate way to sort out those who are college bound.

that the characteristics of those with positive intentions in this group may not be compared directly with those in the younger age group discussed above. Not only are they a different age group, but also a significant number of those with positive intentions who might have belonged to the latter group when they were younger have already joined the armed services; hence those with positive intentions in our sample represent a residual group. With this difference in mind, it is interesting to examine the factors associated with positive intentions among this older group, paying particular attention to the mental eligibility of the respondents. The logit equations by race are reported in Table 2.4.

Again we find significant racial differences in enlistment behavior. In fact, educational attainment was the only variable significant for all races, and its inverse relationship to enlistment intention was expected. Two reasons are offered for this finding: first, the likelihood of finding employment in the civilian labor market is smaller for those who have fewer years of schooling than for those who have more years of schooling. Second, since first-term enlistees, or at least enlistees at the entry level, are paid the same according to the fixed pay schedule, some disincentive occurs for individuals who have more years of schooling because if both more and less schooled people are paid the same, the former group is underpaid, and the latter is overpaid in terms of human capital input. The inverse relationship may also partially reflect negative intentions among college enrollees.

Among older black youths, six additional variables were significant. First, the Knowledge of the World of Work test score, used here as a proxy for ability, showed a significant and negative effect. The logic for this finding is similar to that for the negative effect of educational attainment. Second, respondents who indicated that they would be in school in 5 years were more

Table 2.4 Logit Estimations of Positive Intentions to Enlist: 18-21 Year Old Non-High School Seniors^a

Variable	Race					
	Coefficient		Black	Hispanic	White	
	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.
Constant	10.7676	4.11**	6.8296	3.04**	0.7587	0.49
Parental education	-	-	-0.0332	-0.81	-	-
Siblings	0.0700	1.67*	-	-	0.0153	0.30
Educational attainment	-0.4956	-3.65**	-0.6278	-3.73**	-0.2335	-1.99**
Age	-0.3155	-2.53**	-	-	-	-
Ability measure	-0.1233	-1.81*	-0.0614	-0.76	-0.1059	-1.88*
Educational discrepancy	0.0406	0.40	0.0730	0.52	0.1294	1.67*
Internality (Rotter)	0.0331	0.59	-0.0329	-0.45	0.0619	1.43
Training	0.5178	1.54	0.1337	0.32	0.7909	3.00**
Single parent family	-0.1846	-0.73	0.5158	1.49	-0.1883	-0.70
In school in 5 years	0.6429	2.40**	0.6654	1.94*	-	-
Enrolled	-	-	-	-	-0.1401	-0.54
Unemployment rate	-0.0938	-2.23**	-0.0033	-0.05	0.0436	0.55
Weeks unemployed	0.0074	0.56	0.0623	2.16**	0.0241	1.08
Wage	0.0016	1.75*	-0.0013	-1.01	-0.0018	-2.08**
Log of likelihood function	-196.08		-114.65		-323.83	
Sample size	376		245		1029	

* Significant at the .05 level, one-tailed test.

**Significant at the .025 level, one-tailed test.

^aThose who have ever served in the military are excluded.

likely to intend to enlist than those who said they would not be in school. This result is rather surprising, but its implication is more understandable when the effect of another variable is simultaneously taken into account--the siblings variable, a proxy for the availability of parental financial support for higher education. The coefficient for siblings indicates that individuals from lower socioeconomic status backgrounds are more likely to intend to enlist. Therefore, we can safely conjecture that for these black youths, the principal motivation for enlistment might be to obtain post-service educational benefits.²⁵ Third, labor market conditions yielded a strong negative impact on intentions, a somewhat unusual result because adverse labor market conditions are expected to affect enlistment intentions positively.²⁶ Finally, older black youth are less likely to intend to enlist. This can be explained by the sample composition--youth who intended to enlist have had a

²⁵It was argued elsewhere that although the primary motivation for enlistment for many enlistees might be to qualify for the post-service educational benefits, many of those may not actually return to school after completing their 3 or 4 years of service. The human capital theory rationale for this argument was that unless individuals have specifically computed their net returns from investment in education over their life-cycle, it is uncertain that their initial motivation would be realized because the cost of education is positively correlated with age, and the returns from education are inversely associated with age. See Chapter 1.

²⁶One possible explanation is that if labor market conditions are relatively stable, high unemployment areas may have already sent their enlistees into the armed services. Another conjecture is that this unemployment variable may capture the effects of the location of residence. Youths in the South are generally known to have stronger preferences for the military service. Considering that the unemployment rates in the southern states are lower than those in the northern industrial states, a negative coefficient may simply reflect higher intentions to serve among black youths living in the South.

longer time to do so if they are older.

For the older Hispanics, in addition to the commonly important educational attainment variable, two other variables were significant. As with their black counterparts, the variable indicating their expected enrollment status in 5 years showed a positive and significant coefficient. Another important variable was the number of weeks unemployed; the positive effect was obviously expected, indicating that some Hispanic males considered the military service as an alternative to civilian unemployment.

The factors which affect the intentions to enlist for white youths age 18-21 turned out to be considerably different from those which influence positive intentions for minority youths of the same age. First, it is very interesting to find that individuals who desire some kind of occupational or on-the-job training beyond their regular schooling were more likely to express positive intentions to enlist. This variable was not significant for minorities, which implies that while white youths view the military service as a way of obtaining occupational skills, minorities view it as a means of obtaining post-service educational benefits (i.e., positive and statistically significant coefficients for the in school in 5 years variable). Second, the wage variable produced the expected negative coefficient and was statistically significant for whites. We expected a negative coefficient because, given the military wage, the armed services should be viewed as more attractive for those who earn less in the civilian economy than for those who earn more.²⁷

²⁷Although the coefficient of the wage variable was statistically significant, the positive sign on the coefficient was surprising. Theoretically we expected a negative coefficient of the wage variable because, at the given military pay level, the military service would be viewed as less attractive for those who earn or expect to earn higher civilian wages than for those who earn or expect to earn lower civilian wages. We imputed the wage rates for nonworking persons. For these computations, we estimated the wage rate equations for each race with particular attention being paid to the sample

As for blacks, the coefficient of the ability measure was negative and statistically significant. In addition, white males who desire to receive more education than they expect to attain are more likely to intend to enlist.

In sum, for all races in this 18-21 age group (excluding high school seniors), educational attainment was shown to affect enlistment intentions negatively. Minority youths who expected to be in school in 5 years and white males who desired more years of schooling than they expected to attain were more likely to intend to enlist, while white youths who desired some kind of occupational training expressed positive intentions. Among whites, those who earned less indicated positive intentions. Finally, it may be useful to note that the strong negative coefficients on educational attainment, together with the negative coefficients on the ability measure, may indicate that some proportion of those individuals with positive intentions are demand-constrained for enlistment (that is, the less qualified youths are accepted for enlistment as a last resort to meet recruiting quotas).

Male High School Seniors

The intentions to enlist among the high school senior group deserve particular attention, not only because their intentions are more realistic than those of the younger age group (14-17 year olds), but also because this is the group whose enlistments are known to be supply determined (i.e., these high ability recruits have been in short supply). Considering that the viability of the AVF system depends upon the capability of the military authorities to recruit high quality enlistees, the group with positive intentions among high school seniors will constitute the core pool eligible for enlistment. Table 2.5 contains the estimated logit equations by race.

selectivity problem. For details, see Appendices II-D, II-E, and II-F.

Table 2.5 Logit Estimations for Positive Intentions to Enlist: Male High School Seniors^a

Variable	Race					
	Coefficient		Black	Hispanic	White	
			Coefficient	t-stat.	Coefficient	t-stat.
Constant			-0.9255	-0.50	-3.4694	-1.72*
Parental education			-	-	-	-
Siblings			0.0415	0.55	-	-
Ability measure			-0.0591	-0.52	0.0636	0.49
Educational discrepancy			0.1972	1.28	-0.1916	-0.73
Significant others			0.2620	0.43	2.0245	2.03**
Age over 17			0.3572	0.67	1.5103	1.69*
Internality (Rotter)			0.0734	0.87	0.0620	0.54
Training			0.0341	0.65	0.5548	0.94
Single parent family			0.7298	1.78*	0.6588	1.06
South			0.7306	1.19	-	-
Not in labor force			-0.8870	-2.03**	-0.8317	-1.42
Unemployment rate			-0.1248	-1.21	0.0348	0.38
Weeks unemployed			-0.0304	-0.67	-0.3980	-1.37
Log of likelihood function			-79.57		-43.29	
Sample size			141		77	
						265

* Significant at the .05 level, one-tailed test.

**Significant at the .025 level, one-tailed test.

^aThose who have ever served in the military are excluded.

Unlike the previous two groups, this one shows no commonly significant variables across racial lines--the characteristics of the respondents with positive intentions are significantly different for blacks, Hispanics and whites.

For black high school seniors, two factors apparently turned out to be important. Black youths from single-parent families and those who participate in the labor force indicated positive intentions to enlist.

We could not find any significant relationships between personal characteristics and positive intentions among Hispanic high school seniors. Indeed, the only significant variable in the analysis was perceived opinions of significant others. Since the question of the perceived opinions of significant others was asked only of 14 to 17 year olds, a dummy variable which captures the age effect, age over 17, was also included. The combined result indicates that among high school seniors who were 17 or younger, those who think the most influential person in his life would approve his joining the armed services are more likely to intend to enlist, but the seniors age 18 and over are more likely to intend to enlist than younger ones.

In contrast to findings about minorities, the factors which influence enlistment intentions for white high school seniors were rather clearly identified and the statistically significant variables yielded the expected relationships with enlistment behavior. Negative intentions were expressed by those seniors who have higher socioeconomic backgrounds, while seniors who have a large number of siblings said they would try to enlist. Both of these results could be interpreted as indicating that the military service is more attractive to those who have rather limited opportunities to go on to college. As with Hispanics, the perceived opinions of significant others was important among white seniors. Moreover, as expected, white youths who have

experienced more weeks of unemployment and those who faced worse labor market conditions expressed positive intentions more frequently than the others. Finally, the most interesting finding is the positive correlation between enlistment intentions and the desire of these white youths to receive some kind of occupational or on-the-job training, a result consistent with the finding for the older white cohort age 18 to 21. Thus, we may safely conclude that for the age-eligible white youths an important motivation for enlistment is the desire to obtain some occupational training or skills.

III. Probability Estimates and Partial Derivatives of Enlistment Intentions

The previous section focused on the determinants of positive intentions. This section will present the probability estimates of enlistment intentions for several hypothetical persons and show how these estimates would vary with differences in certain individual characteristics.²⁸ The characteristics of the hypothetical black, Hispanic and white youths are described in Table 2.6.^{29,30}

²⁸Although a detailed discussion requires several hypothetical persons for each group, to make the presentation simpler, we configure only one person for each group.

²⁹Generally, each person is assigned the mean value of his respective age group; however, he is given some meaningful value, for example, 10 years of schooling rather than 10.2 years or a value of either one or zero in the case of dummy variables. Our probability estimates for these hypothetical persons could be somewhat different from their sample means. Although we assign the values which are close to the mean for the continuous variables, we did not assign the mean values for the qualitative variables. Also in nonlinear estimation, there is no reason to expect that the mean values of the independent variables should cross the mean of the dependent variable.

³⁰The partial derivatives represent the change in probability estimates attributable to a unit increase in the specific explanatory variable when all

Table 2.6 Characteristics of Typical Persons

Variable	14-17 year old non-high school senior	18-21 year old, non-high school senior	High school senior
Parental education	11	9	12
Siblings	-	4	5
Single parent family	1	1	1
Parents in military	-	0	-
Ability measure ^a	0.05	0.06	0.06
Educational attainment	9	12	-
Age	-	19	-
Educational discrepancy	1	1	1
Internality (Rotter) ^b	0.09	0.09	0.09
Training	1	1	1
Unemployment rate	6	6	6
Significant others	1	-	1
Age over 17	-	-	0
Discrimination	1	1	1
In school in 5 years	0	0	0
Rural/urban	0	-	0
Married	-	0	-
Enrolled	1	0	-
Not in labor force	0	-	0
Unemployed	-	-	1
Weeks unemployed	0	2	2
Poor income family	0	-	-
Wage	-	365	-

^aAbility measure ranges between 0 and 0.09.^bRotter score ranges between 0.04 and 0.16.

14 to 17 Year Old Males, Excluding High School Seniors

Table 2.7 presents the probability estimates of intending to enlist for the hypothetical 14-17 year old. The probability of having a positive enlistment intention is higher for a black (67 percent) and a Hispanic youth (66 percent) than for a white (55 percent). The discussion of partial derivatives below is confined only to those effects which were statistically significant in the logit estimations.

For blacks, an additional year of schooling would decrease positive enlistment intention probability by 5 percentage points while one more year of discrepancy between desired and expected years of schooling would increase the probability by 2 percentage points. For whites, the effect of an extra year of schooling is analogous to that of blacks--around a 5 percentage point drop in probability. A one percentage point increase in the unemployment rate would increase the white's probability of having positive enlistment intentions by 2 percentage points.

For all three race groups, the perceived influence of significant others produced the greatest impact on positive enlistment intentions: if these individuals perceived that their significant others would not approve their joining the armed services, the estimated enlistment probability for a black male would drop by 19 percentage points; for a Hispanic male by 31 percentage points; and for a white young man by 27 percentage points. The desire for occupational training was also very important for minority teenagers,

other variables are held constant. Unlike the least squares estimates, the partial derivatives for logit estimations are not constant; they are dependent upon where the values were measured in terms of both the explanatory variable under consideration and all other right hand side variables. Because the qualitative variables are not differentiable, the change in probability due to a change in the explanatory variable from either one to zero or zero to one cannot be called, strictly speaking, a partial derivative.

Table 2.7 Partial Derivatives of Positive Enlistment Intentions with Respect to Selected Explanatory Variables: 14-17 Year Old Male Non-High School Seniors

	Black	Hispanic	White
Predicted probability, \hat{p}	0.6670	0.6603	0.5498
$\Delta \hat{p}$: parental education increases from 11 to 12 years	-0.0092 ^a	-0.0128	-0.0129
$\Delta \hat{p}$: single parent family changes from 1 to 0	-0.0801	-0.0533 ^a	0.0007 ^a
$\Delta \hat{p}$: ability measure increases from 0.05 to 0.06	-0.0001 ^a	-0.0001 ^a	-0.0002
$\Delta \hat{p}$: educational attainment increases from 9 to 10	-0.0490	-0.0216 ^a	-0.0542
$\Delta \hat{p}$: educational discrepancy increases from 1 to 2 years	0.0242	-0.0114 ^a	0.0147 ^a
$\Delta \hat{p}$: training changes from 1 to 0	-0.0921	-0.1068 ^a	-0.0299 ^a
$\Delta \hat{p}$: unemployment rate increases from 6 to 7	-0.0113	-0.0021 ^a	0.0225
$\Delta \hat{p}$: significant others changes from 1 to 0	-0.1941	-0.3065	-0.2654
$\Delta \hat{p}$: in school in 5 years changes from 0 to 1	-0.1112	-0.0547 ^a	-0.0493 ^a
$\Delta \hat{p}$: not in the labor force changes from 0 to 1	-	0.1068	-
$\Delta \hat{p}$: weeks unemployed changes from 0 to 1	0.0108	0.0064 ^a	0.0038 ^a

^aCoefficients were not statistically significant at conventional significance level (see Table 2.3).

indicating a decrease in enlistment probabilities of 9 to 11 percentage points had they not aspired for occupational training.

For this young age group, parental education produced small partial derivatives for all races: that is, a one year increase in parental education would increase the positive enlistment intention probability by only one percentage point. For blacks, the probability of intending to enlist of a young man from a two-parent home is about 8 percentage points (or 12 percent) lower than that of a young man from a single parent home. Also, for a black young man, an additional week of unemployment time would increase the probability of intending to enlist by one percentage point, and intention to be in school in 5 years would decrease the probability by 11 percentage points. For Hispanics, a young man who is not in the labor force has about 11 percentage points (or 16 percent) higher enlistment intention probability than a young man who participates in the labor market.

18 to 21 Year Old Males, Excluding High School Seniors

The predicted probabilities of having positive enlistment intentions for the 18 to 21 year old age group were substantially lower than for the younger men (Table 2.8). Again, however, the predicted probabilities for blacks (38 percent) and Hispanics (34 percent) were significantly higher than those for whites (17 percent).

For a black and a Hispanic male, an additional year of schooling would reduce the probability of intending to enlist by 11 and 12 percentage points, respectively, while for a white male, it would decrease by only 3 percentage points. In addition, one more year of difference between desired and expected schooling, which yielded a statistically significant coefficient only for white males, would increase the probability of positive enlistment intention

Table 2.8 Partial Derivatives of Positive Enlistment Intentions with Respect to Selected Explanatory Variables: 18-21 Year Old Male Non-High School Seniors

	Black	Hispanic	White
Predicted probability, \hat{p}	0.3802	0.3415	0.1682
$\Delta \hat{p}$: siblings increases from 4 to 5	0.0166	-	0.0022 ^a
$\Delta \hat{p}$: ability measure increases from 0.06 to 0.07	-0.0017	-0.0001 ^a	-0.0001
$\Delta \hat{p}$: educational attainment increases from 12 to 13	-0.1082	-0.1247	-0.0302
$\Delta \hat{p}$: age increases from 19 to 20	-0.0711	-	-
$\Delta \hat{p}$: educational discrepancy increases from 1 to 2 years	0.0096 ^a	0.0166 ^a	0.0189
$\Delta \hat{p}$: training changes from 1 to 0	-0.1125 ^a	-0.0294 ^a	-0.0842
$\Delta \hat{p}$: unemployment rate increases from 6 to 7	-0.0218	-0.0007 ^a	0.0062 ^a
$\Delta \hat{p}$: in school in 5 years changes from 0 to 1	0.1583	0.1607	-
$\Delta \hat{p}$: weeks unemployed increases from 2 to 3	0.0017 ^a	0.0141	0.0034 ^a
$\Delta \hat{p}$: wage increases from \$3.65 by 10 percent	0.0139	-0.0106 ^a	-0.0090

^aCoefficients were not statistically significant at conventional significance level (see Table 2.4).

by two percentage points. One more year of age would decrease the enlistment intention probability of a black male youth by 7 percentage points (or 19 percent), and an additional week of unemployment would increase the probability of intending to enlist of a Hispanic young man by one percentage point (or 4 percent).

Substantially higher probabilities were observed for those minorities who expected to be enrolled in 5 years (16 percentage points) and whites who desired occupational training (8 percentage points).

On the other hand, several statistically significant variables produced very small effects. Although the wage rate variable yielded a significant coefficient for white males, a 10 percent increase in hourly (imputed) wage rates would lead to only a one percentage point or five percent decrease in enlistment intention probabilities. For a black young man, an increase in the number of siblings would increase the probability of intending to enlist only about two percentage points (or 4 percent).

Male High School Seniors

The predicted probabilities of having positive enlistment intentions for typical male high school seniors appear in Table 2.9. Unlike the case of non-high school senior males, the predicted likelihood of having positive enlistment intentions is lowest for a Hispanic (27 percent), intermediate for a white (36 percent), and highest for a black high school senior (43 percent).

Only a few variables had significant partial derivatives. For blacks, a senior from a two parent family has a smaller probability by 16 percentage points (or 38 percent) and those not in the labor force had predicted probabilities of intending to enlist 19 percentage points lower. Hispanics who were under 18 years old who thought their significant other would not

Table 2.9 Partial Derivatives of Positive Enlistment Intentions with Respect to Selected Explanatory Variables: Male High School Seniors

	Black	Hispanic	White
Predicted probability, \hat{p}	0.4252	0.2688	0.3570
$\Delta\hat{p}$: parental education increases from 12 to 13 years	-	-	-0.0427
$\Delta\hat{p}$: single parent family changes from 1 to 0	-0.1624	-0.1090 ^a	-
$\Delta\hat{p}$: training changes from 1 to 0	-0.0083 ^a	-0.0945 ^a	-0.1580
$\Delta\hat{p}$: unemployment rate increases from 6 to 7	-0.0302 ^a	0.0069 ^a	0.0724
$\Delta\hat{p}$: significant others changes from 1 to 0	-0.0625 ^a	-0.2225	-0.2704
$\Delta\hat{p}$: age over 17 changes from 0 to 1	0.0887 ^a	0.3559	0.3618
$\Delta\hat{p}$: not in the labor force changes from 0 to 1	-0.1917	-0.1309 ^a	0.0666 ^a
$\Delta\hat{p}$: weeks unemployed increases from 2 to 3	-0.0074 ^a	-0.0708 ^a	0.0240

^aCoefficients were not statistically significant at conventional significance level (see Table 2.5).

approve of military service had predicted probabilities 22 points lower than those who thought the significant other would approve and those seniors over 18 were predicted to be much more likely to enlist (by 36 percentage points).

For white seniors, a one year increase in parental education is associated with about 4 percentage points decrease in positive intention probabilities. Significant others and being at least 18 years old turned out to display the most important impacts on enlistment intentions (27 and 36 percentage points, respectively) and the training variable also exerted an important role in formulating positive intentions for the white senior group--16 percentage points. Finally, a one percentage point rise in the unemployment rate increased the enlistment intention probability by 7 percentage points and a one week increase in personal unemployment increased it by 2 percentage points.

IV. Summary of Findings and Policy Implications

This study investigated the factors which affected enlistment intentions positively. The 1979 NLS Youth Cohort data formed the basis of our analysis. The universe consisted of males age 14 to 21, classified into three subcategories: 14 to 17 year olds excluding high school seniors, 18 to 21 year olds excluding high school seniors, and high school seniors. The first sub-universe provides information for the future enlistment pool, the second group includes the immediately available enlistment pool, and the third represents the high quality enlistment pool. Because we expected differential behavior among different races, the data were stratified by race. Since the dependent variable was qualitative, indicating whether the respondent's intention to enlist was positive or negative, we applied logit estimation

procedures to compute the probability estimates for enlistment intentions.³¹

We found, in general, very discernible age and racial differences. Among 14 to 17 year olds, we found that positive intentions were related inversely to socioeconomic status, and positively correlated with the perception of approval of enlisting in the military by the person who has the most influence upon the respondent's decisions. The above findings were common to all races.

Black youths who expected to attain fewer years of schooling than they desired were more likely to intend to enlist than those whose expectations equalled their aspirations. This finding suggests that the primary purpose of enlisting in the military for these youths may be to take advantage of the post-service educational benefits.³² Also, black youths who did not live with both of their natural parents at age 14 were more likely to intend to enlist. For white youths, poor labor market conditions would affect enlistment intentions favorably. Likewise, some blacks who have been unemployed for a long time indicated positive enlistment intention. Obviously, these results indicate that the military service is favored by those who perceive or experience hardships in finding employment in the civilian economy. White young men who score high on the ability measure were less likely to intend to enlist in the military.

The behavioral pattern for 18 to 21 year old non-high school seniors was

³¹This study did not include a measure for physical conditions. Considering that almost half of all those applying to join the armed services fail the physical examinations, an introduction of a good health measure is an imminent need.

³²On the other hand, these youths may perceive less discrimination (against people with low educational attainment) in the military service than elsewhere. In other words, they might perceive that returns to investment in education are smaller in military occupations than in their civilian alternatives.

different from that of the younger age group. The most interesting finding for this group is that post-service educational benefits may have been the principal reason for enlistment among black and Hispanic youths, while obtaining occupational or on-the-job training other than regular schooling appeared to be the primary motivation for enlistment among whites. For white youths, those who earn (or are expected to earn) less were more likely to intend to enlist than those who earn (or are expected to earn) more. As with the younger age group, educational attainment was shown to be inversely associated with enlistment intentions for all races.

Among high school seniors, we also find discernible racial differences. For minority groups, we do not find significant effects from general personal attributes such as socioeconomic status, whereas we still observe an inverse relationship between intentions and socioeconomic status among white seniors. We interpret this result as indicating that the control factor (i.e., achieving high school senior status) served as an indicator of success for minorities, but was not significant for whites; thus, the minority group is a more select, homogeneous group. For blacks, those who did not live with both of their natural parents at age 14 and those who are in the labor force were more likely to intend to enlist. White high school seniors who desire to obtain occupational training and those who live in areas where labor market conditions are poor tend to express positive intentions to enlist.

We also predicted probability estimates of expressing positive intentions to enlist, given individual characteristics. Hypothetical persons were configured to represent individuals with average ability and socioeconomic status characteristics. Except for Hispanic high school seniors, the hypothetical blacks and Hispanics showed higher probabilities of enlisting. For the high school seniors, the large differences in enlistment probabilities

were attributable to the large coefficients on the qualitative variables such as the desire for occupational training, home environment, and perceived opinions of significant others, implying that specific reasons were more relevant to the intentions of this group than the more general elements such as general socioeconomic background.

We also drew several interesting policy implications from the above analysis, particularly as regards military manpower strategies. First of all, we demonstrated earlier that for young white males age 18 to 21, and especially high school seniors, the availability of training in the armed services turned out to be a very important motivation for enlistment. Also, the results for black non-high school seniors age 14 to 17 indicated the primary influence on intentions to enlist was training opportunity. This finding leads us to conclude that many youths view the military occupation as a way of obtaining skills which might be transferable to their future civilian jobs. Consequently, still more active promotion of the specific occupational training available in the armed services and of the optimal allocation of the enlistees to their desired assignments might bring about desired manpower requirements.

Second, the effects of pay increases in the armed services on recruitment (that is, enlistment elasticities with respect to monetary returns) have always been a key issue in enlistment studies. This variable was significant only for the white 18-21 year old excluding high school seniors group, and the results imply that respondents were not highly responsive to wage incentives. Thus, recruiting policies based upon wage incentives may not be very effective.

The effect of this wage variable has a particularly significant implication for recruiting policies. In the previous section, based upon the

expected negative sign and statistical significance of the wage variable, we concluded that the military service would be viewed as more attractive to those who earn less than to those who earn more. However, the small partial derivatives of the wage variable, and hence small elasticities, indicate that the contribution of wages to positive enlistment intentions is not powerful. To further illustrate, this wage variable can capture the effect of military basic pay on enlistment decisions: since enlistees would be paid the same at the entry level (the military pay variable is, to a large extent, a constant), the wage variable in our study can be regarded as representing civilian pay relative to military pay.³³ A 10 percent increase in wage rates (or in civilian pay) in our example would produce approximately the same results as a 10 percent decrease in military pay. Thus, supposing that entry level military pay is 3 dollars and 65 cents an hour, a 10 percent increase in military pay would increase the positive enlistment intention probabilities of white young men by approximately 1 percentage point, which is about a five percent increase in their predicted probabilities.³⁴ Thus, we can conclude that the positive enlistment intention elasticities with respect to both civilian and military wage are very small for this white group. In other words, monetary incentives are not the most important factor in forming

³³Since the military pay variable is a scalar vector, without loss of generality, we can assign the value of the scalar vector to be one. To illustrate, assume that enlistment decision is specified as a function of military pay, civilian pay, and other exogenous variables: $ENL = F(MP, CP, Z)$, where ENL indicates enlistment, MP and CP represent military pay and civilian pay, respectively, and Z denotes a set of other exogenous variables. Since MP is a scalar vector in our study, the coefficient on MP cannot be distinguished from the constant term of the estimation which represents the intercept. However, in the relative pay model where two pay variables are integrated into one term, CP/MP , because MP is a scalar vector, we can assume the MP variable to be a unit vector without loss of generality.

³⁴The average perceived pay level for the first-term enlistees in NLS data was \$3.35 on an hourly basis.

positive enlistment intentions.

Another important policy issue regarding military enlistment was the exploration of the relationships between civilian labor market conditions and enlistment behavior. Some economists try to determine the positive effect of civilian unemployment on military enlistment decisions, whereas others argue that if more join the armed services, civilian unemployment would decrease.³⁵ We found rather mixed results; a positive correlation of enlistment intention and unemployment rates for young whites (14-17 year olds and high school seniors), and a negative correlation for blacks.

Finally, it is interesting to note that among minority males age 18-21 excluding high school seniors, those who expect to be enrolled in school in five years showed strong positive intentions to enlist. This finding is consistent with the view that one of the primary motivations for enlistment is to take advantage of post-service educational benefits and the fact that minorities generally have lower socioeconomic status. Among minorities who cannot afford to pay for higher education, service in the military seems to be a means of achieving educational goals.

³⁵We used only race-specific state unemployment rates because for many states race-specific youth unemployment rates were not available. Thus, we assumed implicitly that the youth unemployment rates (race-specific) move together with the overall (race-specific) unemployment rates.

Appendix II.A. Comparisons of Mean Values and Standard Deviations for Selected Characteristics Among Male Youth Who Have Never Served, by Age, Race, and Intentions to Enlist

Characteristics	Age 14-17, non-high school seniors			Age 18-21, non-high school seniors			High school seniors		
	Black	Hispanic	White	Black	Hispanic	White	Black	Hispanic	White
Single parent family									
Positive	.55 (.50)	.41 (.49)	.25 (.43)	.47 (.50)	.41 (.49)	.14 (.34)	.41 (.49)	.28 (.45)	.31 (.46)
Negative	.50 (.50)	.35 (.48)	.22 (.42)	.47 (.50)	.29 (.46)	.17 (.38)	.38 (.49)	.27 (.44)	.15 (.36)
Significant others									
Positive	.75 (.43)	.74 (.44)	.77 (.42)	- ^a	-	-	.22 (.42)	.29 (.45)	.32 (.47)
Negative	.58 (.49)	.42 (.49)	.54 (.50)	-	-	-	.24 (.43)	.17 (.38)	.30 (.46)
Enrolled									
Positive	.93 (.26)	.85 (.36)	.92 (.27)	.27 (.44)	.33 (.47)	.28 (.45)	- ^b	-	-
Negative	.93 (.26)	.92 (.27)	.94 (.23)	.32 (.46)	.37 (.48)	.38 (.49)	-	-	-
Training									
Positive	.41 (.49)	.40 (.49)	.32 (.47)	.85 (.37)	.83 (.38)	.84 (.36)	.81 (.39)	.65 (.48)	.78 (.42)
Negative	.34 (.48)	.36 (.48)	.33 (.47)	.77 (.42)	.72 (.45)	.64 (.48)	.77 (.42)	.64 (.48)	.56 (.50)
Discrimination									
Positive	.23 (.42)	.24 (.43)	.18 (.38)	.33 (.47)	.25 (.43)	.26 (.44)	.46 (.50)	.34 (.47)	.45 (.50)
Negative	.19 (.39)	.27 (.44)	.19 (.39)	.35 (.48)	.27 (.44)	.21 (.41)	.41 (.49)	.25 (.44)	.30 (.46)
In school 5 years									
Positive	.52 (.50)	.50 (.50)	.48 (.50)	.37 (.48)	.41 (.49)	.23 (.42)	.28 (.45)	.38 (.49)	.18 (.38)
Negative	.64 (.48)	.64 (.48)	.56 (.50)	.29 (.46)	.27 (.45)	.24 (.42)	.39 (.49)	.50 (.50)	.31 (.46)
South									
Positive	.62 (.49)	.26 (.44)	.28 (.45)	.62 (.49)	.21 (.41)	.24 (.43)	.79 (.41)	.39 (.49)	.21 (.41)
Negative	.51 (.50)	.28 (.45)	.27 (.44)	.49 (.50)	.36 (.48)	.25 (.43)	.47 (.50)	.25 (.43)	.26 (.44)
Not in labor force									
Positive	.48 (.50)	.51 (.50)	.47 (.50)	.20 (.40)	.22 (.41)	.20 (.40)	.24 (.43)	.27 (.45)	.25 (.43)
Negative	.57 (.50)	.51 (.50)	.48 (.50)	.19 (.39)	.23 (.42)	.19 (.39)	.41 (.49)	.42 (.49)	.29 (.45)
Duration of unemployment									
Positive	3.06 (9.46)	1.33 (4.21)	1.26 (5.57)	2.15 (9.96)	2.27 (6.62)	1.21 (5.20)	1.36 (3.86)	0.17 (.70)	2.67 (9.08)
Negative	1.28 (3.44)	1.16 (5.28)	0.90 (3.51)	1.72 (6.69)	0.76 (3.53)	0.48 (2.78)	1.98 (5.34)	0.63 (2.52)	0.40 (1.80)
Home environment									
Positive	.21 (.41)	.21 (.40)	.48 (.50)	.32 (.47)	.24 (.43)	.56 (.50)	.32 (.47)	.25 (.43)	.59 (.49)
Negative	.28 (.45)	.30 (.46)	.53 (.50)	.33 (.47)	.35 (.48)	.58 (.49)	.33 (.47)	.34 (.48)	.61 (.49)

^aOnly 14 to 17 year old youth are asked this question.

^bAll high school seniors are enrolled in school.

Appendix II.B.^a Proportion with Positive Intentions to Enlist Among Male Youth Who Have Never Served, Age and Race: 1979^b (in thousands)

Age Size Race	Age 14-17, non- high school seniors			Age 18-21, non- high school seniors			High school seniors		
	Population	Positive intentions	Percent	Population	Positive intentions	Percent	Population	Positive intentions	Percent
Black	557 (387) ^c	287 (209)	51.5	300 (194)	107 (74)	35.7	94 (70)	41 (34)	43.6
Hispanic	286 (276)	156 (149)	54.5	134 (133)	30 (33)	22.4	31 (32)	13 (13)	41.9
White	2,803 (808)	1,065 (324)	38.0	2,311 (503)	266 (65)	11.5	716 (142)	160 (38)	22.3
Total	3,646 (1,471)	1,508 (682)	41.4	2,745 (830)	403 (172)	14.7	841 (244)	214 (85)	25.4

^aFull time college students and those who aspire and expect to graduate from college are excluded from the universe.

^bIn NLS data, each respondent has a differential weight which is an inverse to the probability of being selected.

This sampling weight is introduced in these computations in order to represent the population estimates.

^cNumbers in parentheses represent unweighted cell sizes.

Appendix II.C.^a Comparisons of Mean Values and Standard Deviations for Selected Characteristics Among Male Youth Who Have Never Served, by Age, Race, and Intentions to Enlist*

Characteristics	Age 14-17, non-high school seniors			Age 18-21, non-high school seniors			High school seniors		
	Black	Hispanic	White	Black	Hispanic	White	Black	Hispanic	White
Number of siblings									
Positive	5.96 (3.20)	5.99 (3.10)	4.39 (2.23)	5.81 (2.59)	6.19 (2.55)	4.49 (2.48)	5.65 (2.35)	7.42 (3.54)	4.28 (2.12)
Negative	5.95 (2.68)	5.82 (2.89)	4.17 (1.99)	5.84 (2.99)	5.48 (2.88)	4.19 (1.97)	5.31 (2.60)	5.78 (2.58)	4.01 (1.84)
Parental education									
Positive	10.73 (2.25)	7.92 (3.91)	11.39 (2.23)	10.54 (2.05)	7.36 (4.03)	11.92 (2.82)	10.74 (3.05)	10.00 (4.02)	11.38 (2.61)
Negative	11.11 (1.79)	8.73 (3.92)	11.68 (2.20)	10.70 (2.34)	8.72 (3.84)	11.84 (2.08)	11.47 (1.37)	8.39 (4.18)	12.49 (2.29)
Educational attainment									
Positive	8.39 (1.31)	8.56 (7.39)	8.43 (1.61)	11.04 (0.88)	10.63 (0.81)	11.43 (.93)	- ^b	-	-
Negative	8.34 (1.94)	8.36 (1.25)	8.52 (1.96)	11.29 (0.92)	11.44 (0.97)	11.67 (.79)	-	-	-
Educational discrepancy									
Positive	0.37 (.88)	0.39 (.85)	0.39 (.91)	0.40 (.79)	0.41 (.75)	0.23 (.65)	0.06 (.23)	0.16 (.54)	0.02 (.17)
Negative	0.27 (.75)	0.48 (.84)	0.35 (.85)	0.29 (.70)	0.23 (.58)	0.20 (.54)	0.08 (.39)	0.28 (.70)	0.14 (.48)
Ability measure									
Positive	3.78 (1.59)	4.10 (1.77)	4.86 (2.01)	4.59 (1.82)	5.12 (1.71)	6.47 (1.87)	4.20 (1.80)	4.80 (1.24)	5.97 (1.81)
Negative	3.87 (1.73)	4.27 (1.81)	5.42 (1.94)	4.88 (1.87)	5.43 (2.33)	6.79 (1.83)	4.78 (1.67)	4.37 (2.23)	6.42 (1.84)
Internality									
Positive	9.40 (2.26)	9.58 (2.27)	9.08 (2.32)	8.72 (2.39)	4.04 (1.88)	8.77 (2.60)	8.78 (2.64)	9.01 (2.32)	9.00 (2.57)
Negative	9.29 (2.14)	9.65 (2.31)	8.92 (2.16)	9.07 (2.48)	8.97 (2.41)	8.23 (2.42)	8.40 (2.10)	8.92 (2.63)	8.58 (2.31)
Unemployment rate									
Positive	9.98 (3.32)	11.12 (2.98)	4.54 (1.07)	10.00 (2.74)	11.07 (2.91)	4.43 (1.13)	9.55 (3.08)	12.68 (3.32)	4.80 (1.00)
Negative	10.62 (3.08)	11.17 (2.70)	4.46 (1.04)	10.74 (3.39)	10.79 (2.17)	4.53 (1.23)	11.01 (3.21)	11.33 (3.01)	4.58 (1.15)
Single parent family									
Positive	.56 (.50)	.44 (.50)	.31 (.46)	.44 (.50)	.42 (.49)	.16 (.36)	.48 (.50)	.16 (.37)	.35 (.48)
Negative	.55 (.50)	.41 (.49)	.24 (.43)	.50 (.50)	.35 (.48)	.20 (.40)	.40 (.49)	.22 (.42)	.16 (.37)
Significant others									
Positive	.75 (.44)	.72 (.45)	.73 (.45)	- ^c	-	-	.21 (.41)	.15 (.36)	.31 (.46)
Negative	.60 (.49)	.44 (.50)	.54 (.50)	-	-	-	.23 (.42)	.29 (.45)	.27 (.44)

Appendix II.C. (continued)

Race	Age 14-17, non-high school seniors			Age 18-21, non-high school seniors			High school seniors		
	Black	Hispanic	White	Black	Hispanic	White	Black	Hispanic	White
Characteristics									
Enrolled									
Positive	.90 (.30)	.79 (.41)	.88 (.33)	.16 (.37)	.17 (.38)	.08 (.27)	- ^d	-	-
Negative	.87 (.33)	.85 (.36)	.90 (.29)	.08 (.27)	.10 (.31)	.04 (.19)	-	-	-
Training									
Positive	.42 (.49)	.41 (.49)	.36 (.48)	.83 (.38)	.79 (.41)	.83 (.38)	.82 (.39)	.63 (.49)	.85 (.36)
Negative	.41 (.49)	.37 (.48)	.40 (.49)	.82 (.38)	.77 (.42)	.72 (.45)	.83 (.38)	.65 (.48)	.72 (.45)
Discrimination									
Positive	.24 (.42)	.25 (.43)	.20 (.40)	.34 (.47)	.30 (.46)	.19 (.39)	.44 (.50)	.28 (.45)	.39 (.49)
Negative	.20 (.40)	.25 (.43)	.19 (.39)	.38 (.49)	.21 (.41)	.21 (.41)	.51 (.50)	.24 (.43)	.36 (.48)
Expect in school 5 years									
Positive	.35 (.48)	.30 (.46)	.21 (.41)	.25 (.43)	.11 (.31)	.11 (.31)	.15 (.36)	.05 (.22)	.04 (.19)
Negative	.38 (.49)	.31 (.46)	.20 (.40)	.15 (.35)	.13 (.34)	.10 (.30)	.08 (.27)	.24 (.43)	0 (-)
South									
Positive	.66 (.47)	.23 (.42)	.31 (.46)	.64 (.48)	.21 (.41)	.28 (.45)	.72 (.45)	.29 (.46)	.23 (.42)
Negative	.57 (.49)	.18 (.38)	.27 (.44)	.53 (.50)	.24 (.43)	.20 (.40)	.58 (.49)	.20 (.40)	.16 (.37)
Not in labor force									
Positive	.48 (.50)	.49 (.50)	.42 (.49)	.09 (.28)	.21 (.41)	.06 (.24)	.29 (.45)	.16 (.37)	.31 (.46)
Negative	.51 (.50)	.43 (.50)	.45 (.50)	.15 (.36)	.13 (.33)	.04 (.21)	.31 (.46)	.49 (.50)	.20 (.40)
Duration of unemployment									
Positive	2.87 (9.22)	.91 (2.23)	1.52 (6.04)	3.34 (13.09)	4.08 (9.11)	1.84 (6.82)	1.96 (4.95)	.20 (.88)	3.78 (10.78)
Negative	1.20 (3.05)	1.77 (7.18)	1.10 (4.44)	3.11 (10.20)	1.03 (3.99)	0.76 (3.72)	2.32 (5.13)	.21 (1.00)	.55 (2.44)
Home environment									
Positive	.16 (.36)	.19 (.39)	.39 (.49)	.22 (.41)	.13 (.34)	.42 (.49)	.23 (.42)	.21 (.41)	.64 (.48)
Negative	.16 (.37)	.16 (.37)	.40 (.49)	.20 (.40)	.35 (.48)	.45 (.50)	.22 (.42)	.09 (.29)	.56 (.50)

^aFull time college students and those who expect and aspire to graduate from college are excluded from the universe.

^bBy definition, high school seniors have attained 11 years of education.

^cOnly 14 to 17 year old youth are asked this question.

^dBy definition, all high school seniors are enrolled in school.

Appendix II-D: Estimation of Wage Equations

One of the more important questions in estimating the wage equations in recent years has been the scope of the universe. In other words, although wages are basically defined for the individuals who are employed, the wage equations confined on those subsamples of working people are regarded as incomplete in representing population parameters. That is, the findings based on this subsample (employed) may be explained in part by the sample selection process on the basis of the characteristics of the dependent variable (that is, excluding the individuals who have no wages). Heckman introduced a technique to estimate the unbiased estimates of the parameters by accounting for the sample selection bias problem.

The essence of Heckman's technique can be very briefly described as follows. Following Heckman's notation, write the population regression function as

$$Y_i = X_i\beta + U_i \quad (1)$$

for a random sample of I observations, equations for individual i may be written as

$$Y_{1i} = X_{1i}\beta_1 + U_{1i} \quad (1a)$$

$$Y_{2i} = X_{2i}\beta_2 + U_{2i} \quad (1b)$$

The population regression function for equation (1a) may be written as

$$E(Y_{1i}|X_{1i}) = X_{1i}\beta_1, \quad i = 1, \dots, I \quad (2)$$

The regression function for the incomplete sample may be written as

$$E(Y_{1i}|X_{1i}, \text{Sample Selection Rule}) = X_{1i}\beta_1 + E(U_{1i}|\text{Sample Selection Rule}), \quad i = 1, \dots, I \quad (3)$$

The key point of the analysis is that in case the conditional expectation of U_{1i} is zero, then regressions derived from the subsample will yield unbiased population estimates, β_1 .

Under the assumption that the joint density of U_{1i} and U_{2i} in equations (1a) and (1b) is bivariate normal, it is shown that

$$E(U_{1i} | Y_{2i} > 0) = E(U_{1i} | U_{2i} > -X_{2i}\beta_2) = \frac{\sigma_{12}}{(\sigma_{22})^{1/2}} \lambda_i \quad (3)$$

where λ_i is the ratio of the ordinate of a standard normal to the cumulative distribution function. The density and distribution function of the standard normal distribution can be obtained from probit analysis, where the members of subsamples whose dependent variables are observed are assigned a value of one and the rest are assigned zeros.

Therefore, in samples where sample selection problem is of less importance, the value of λ becomes negligibly small and so the coefficients in (1a) from least squares estimates will be optimal.

Appendix II.E presents the probit estimates of employment probability equations. The coefficients represent the maximum likelihood estimates and the numbers in parentheses denote asymptotic t-statistics. The coefficients of the probit estimations represent the change in standard deviations of the normally distributed variable. The set of explanatory variables in the equations combines both X_1 in (1a) and X_2 in (1b).

The wage equations specified with and without an additional independent variable are reported in Appendix II.F.

Appendix II.E. Probit Estimations for Employment Probability Among Male Youth Who Have Never Served, Aged 18-22, and Who Are Not Currently Enrolled in School^a

	Black		Hispanic		White	
	Maximum likelihood estimates	Asymptotic t-stats.	Maximum likelihood estimates	Asymptotic t-stats.	Maximum likelihood estimates	Asymptotic t-stats.
Constant	-0.8335	(-0.61)	0.2142	(0.13)	0.5343	(0.55)
Parental education	-0.0320	(-1.04)	0.0363	(1.46)	-0.0162	(-0.79)
Siblings	-0.0241	(-0.95)	-0.0066	(-0.20)	0.0151	(0.62)
Ability measure	-0.0190	(-0.51)	0.0477	(1.17)	0.0306	(1.13)
Educational attainment	0.0510	(0.67)	-0.1140	(-1.97)	0.0934	(1.81)
High school diploma	0.0475	(0.22)	0.3363	(1.38)	0.5704	(3.57)
Health	-0.8623	(-2.62)	-0.4797	(-1.46)	-0.4173	(-2.06)
Married	0.7354	(1.88)	0.2823	(1.17)	0.4964	(3.12)
Unemployment	-0.0565	(-2.02)	-0.0279	(-0.80)	-0.0763	(-1.82)
South	0.0574	(0.29)	0.2742	(1.11)	0.2074	(1.54)
SMSA	0.1818	(1.00)	-0.0885	(-0.34)	-0.1301	(-1.18)
Age	0.0859	(1.38)	0.0695	(0.90)	-0.0428	(-0.94)
Discrimination	0.0363	(0.24)	-0.4806	(-2.45)	0.0946	(0.77)
-2 times log likelihood ratio		23.58		19.00		79.94
N		358		259		848
N (Dep = 1)		236		187		679
N (Dep = 0)		122		72		169

^a A small number of individuals who are self-employed or farmers are excluded.

Appendix II.F. Least Squares Estimates of Wage Equations With and Without Lambda (λ) Among Male Youth Who Have Never Served, Age 18-22, Non-Enrolled, Non-Self Employed, Non-Farm Workers^a

	Black		Hispanic		White	
	Estimations with λ	Estimations without λ	Estimations with λ	Estimations without λ	Estimations with λ	Estimations without λ
Constant	4.0139 (4.65)	4.5345 (8.85)	5.2490 (9.25)	4.9779 (9.26)	4.6260 (15.37)	4.4959 (17.91)
Age	0.0497 (1.57)	0.0335 (1.45)	0.0138 (0.50)	0.0248 (0.94)	0.0549 (4.33)	0.0506 (4.43)
Ability measure	0.0212 (1.39)	0.0244 (1.68)	-0.0196 (-1.07)	-0.0021 (-0.16)	0.0075 (0.99)	0.0100 (1.47)
Educational attainment	0.0256 (0.87)	0.0165 (0.61)	0.0417 (1.74)	0.0168 (1.01)	0.0027 (0.14)	0.0119 (0.83)
High school diploma	0.1043 (1.37)	0.0997 (1.32)	-0.1470 (-1.36)	-0.0476 (-0.57)	-0.0065 (-0.08)	0.0505 (1.17)
Health	-0.1464 (-0.50)	0.0316 (0.19)	0.1516 (0.90)	0.0012 (0.01)	0.0484 (0.59)	0.0057 (0.09)
Married	0.1905 (1.09)	0.0847 (0.82)	-0.0124 (-0.13)	0.0698 (0.93)	0.0273 (0.41)	0.0717 (2.09)
Unemployment rate	-0.0008 (-0.05)	0.0095 (0.89)	0.0052 (0.36)	-0.0039 (-0.30)	0.0277 (1.82)	0.0195 (1.77)
South	0.0629 (0.84)	0.0517 (0.71)	-0.1114 (-1.11)	-0.0285 (-0.35)	-0.0655 (-1.69)	-0.0488 (-1.51)
Live in SMSA	0.1425 (1.92)	0.1137 (1.79)	0.1034 (1.25)	0.0984 (1.19)	0.0661 (2.12)	0.0539 (2.00)
Discrimination	0.0019 (0.03)	-0.0075 (-0.13)	0.2483 (2.05)	0.1101 (1.49)	0.0003 (0.01)	0.0085 (0.29)
Labor union	0.2237 (3.94)	0.2246 (3.96)	0.4597 (5.97)	0.4640 (6.01)	0.3138 (10.57)	0.3156 (10.67)
Tenure	-0.0035 (-0.19)	-0.0047 (-0.26)	0.0264 (1.28)	0.0274 (1.32)	0.0242 (2.77)	0.0241 (2.76)
Full-time employed	0.1120 (1.42)	0.1085 (1.38)	0.2200 (2.15)	0.2144 (2.09)	0.1105 (2.44)	0.1096 (2.42)
Lambda (λ)	0.3454 (0.75)		-0.6388 (-1.44)		-0.2575 (-0.78)	
R ²	0.1804	0.1822	0.2267	0.2213	0.2707	0.2712
S.E.E.	0.3637	0.3633	0.3713	0.3726	0.3128	0.3127
Sample size	214		170		613	

^aNumbers in parentheses represent t-statistics.

Chapter III

The Supply of Potential Reenlistment: A 1979 Cross-Section Study of Intentions to Reenlist Among Those Serving Their First Term of Duty

In recent years, military authorities have faced a serious shortage of experienced personnel,¹ and increasing the first-term reenlistment rate is obviously necessary. However, because youth and vigor have traditionally been considered essential to military job performance, the major recruiting effort is still directed toward new young enlistees rather than toward those already trained and experienced. Of course, youthful vigor is not the only attraction of new accessions: while the service of experienced personnel may be more efficient and productive than that of new recruits, it is also more expensive. Reenlistment beyond the first term often suggests an intention to make the military service a career until retirement, and although recruiting costs may be reduced as reenlistments rise, the aging of military personnel increases costs of salaries, expenses for dependency, and retirement benefits.²

Despite these increases in costs, military authorities now face several compelling reasons for revising their conventional manpower policy. First, because recent demographic developments indicate that the size of the new youth population eligible for enlistment has already begun to decrease, it will be more and more difficult to find the desired number of new accessions. Second, due to this reduced cohort size, improvements in youth labor market conditions in the near future are likely to make recruiting more

¹See the special report in Time (1980) and the New York Times (1980).

²For a detailed discussion, see Binkin and Kyriakopoulos (1979), and Congressional Budget Office (1977), pp. 28-29.

difficult, because recruiters must compete directly with civilian employers. Third, experience and efficiency may be more important factors than youth and vigor in the modern military service: even combat forces must understand how to operate sophisticated equipment. Fourth, current evidence shows that the separation rates of mid-career men have increased sharply. To compensate for the loss of these experienced personnel, retention policies should be reconsidered.³

This chapter investigates the determinants of reenlistment decisions among first-term enlistees. The analysis is based upon human capital theory. Individuals are assumed to behave rationally and to compare the expected pecuniary and nonpecuniary returns from choosing reenlistment with those from not reenlisting. While this rational behavior is an implicit assumption of the analysis, we will also test various hypotheses about reenlistment intention behavior. Indeed, the many competing hypotheses pose the main difficulty in this study: for example, whether an experienced and skilled individual is more likely to reenlist than a less experienced and skilled one is not clear. A skilled military person enjoys a comparative advantage as a scarce resource; by choosing to remain in the military such a person can expect to be relatively rapidly promoted and to be assigned to his desired occupation. On the other hand, a skilled individual will have more opportunities in the civilian job market, a consideration that affects the reenlistment decision negatively. An even more problem-ridden aspect of the analysis is that some individuals enlist in the military service for specific reasons, for example, to take advantage of post-service educational benefits or to obtain certain skills. For these individuals, hypotheses based upon

³See Time (1980).

specific personal characteristics such as educational aspirations and preferences may be more relevant than those emphasizing factors such as general socioeconomic status or monetary returns.

Because job satisfaction is predicted to be a strong indicator of reenlistment intention, special attention will be paid to investigating the relationship between reenlistment intention and the various aspects of job satisfaction such as pay level, job security, and chances for promotion. Thus, this report treats three basic issues of military manpower policy: the pool for recruitment, the decision making process for enlistment, and the factors affecting reenlistment intentions.

This chapter is organized as follows. Data are presented in Section I and empirical results of estimations are reported in Section II. A special analysis of global job satisfaction is contained in Section III, and probability estimates of each individual of having positive reenlistment intention are discussed in the next section. Finally, Section V is a summary of findings and policy implications. Theoretical and empirical issues in specifying a reenlistment intention model are explored in Appendix III-A.

1. Descriptive Statistics⁴

The universe for this study includes all individuals (725 males representing 569,000 service men and 392 females representing 47,000 service women) serving their first term of duty in the active forces as of the interview date. The universe is stratified by sex, and the male subsample is

⁴In this section we present the relationships which are observed. In subsequent sections we will discuss possible explanations for these relationships.

further stratified by race--white (530 members representing 414,000 service men) and minority males (195 members representing 155,000 service men), where the latter subgroup includes both blacks and Hispanics. Due to the small sample size, the female subsample is not disaggregated by race. The dependent variable takes a binary form: individuals who think that they will definitely or probably reenlist at the end of their current term of service have values of one, all others have value zero.

Table 3.1 presents the reenlistment intention rates by sex and race. We find substantial differences in reenlistment intention rates between men and women as well as considerable race differences among males. A higher proportion of females (36 percent) expressed intentions to reenlist than males (25 percent). On the other hand, among males the proportion with positive intentions was higher for minorities (36 percent) than for whites (21 percent). These differences in reenlistment intention across race and sex probably reflect the alternative available employment opportunities in the civilian labor market for the respective race and sex groups.

The comparisons of individual characteristics between those who have positive intentions to reenlist and those who do not appear in Table 3.2. We find an inverse relationship between length of service and positive intentions for all race and sex groups, which may indicate a growing dislike for the military service and/or increasing realization of disamenities attached to the jobs as they serve longer periods. There is also a strong positive impact of job satisfaction status on reenlistment intentions, as expected. However, among those who expressed positive intentions, 10 percent of the females, 12 percent of the white males and 21 percent of the minority males said that they

Table 3.1 Proportion with Positive Intentions to Reenlist by Race and Sex:
1979 First-Term Enlistees

(Numbers in thousands)

	Females	Males		
		Minority	White	Total
Total enlistees	47 (392) ^a	155 (195)	414 (530)	569 (725)
Positive intentions	17 (121)	56 (70)	86 (103)	142 (173)
Percent	35.8	36.4	20.7	25.0

*In NLS data, each respondent has a differential weight which is an inverse to the probability of being selected. This sampling weight is introduced in these computations in order to represent the population estimates.

^aNumbers in parentheses indicate unweighted sample sizes.

Table 3.2 Means and Standard Deviations for Selected Characteristics Among First-Term Enlistees, by Race, Sex, and Intentions to Reenlist: 1979*

Sex-race Intentions Characteristics	Females		Males					
	Positive	Negative	Minority		White		Total	
			Positive	Negative	Positive	Negative	Positive	Negative
Length of service	16.14 (12.04)	20.70 (10.60)	18.75 (10.13)	22.83 (10.79)	20.99 (11.63)	24.41 (11.06)	20.11 (11.11)	24.05 (11.02)
Job satisfaction	.90 (.31)	.55 (.50)	.79 (.41)	.44 (.47)	.88 (.32)	.48 (.50)	.84 (.36)	.47 (.50)
Educational attainment	12.04 (.48)	12.03 (.69)	11.67 (2.01)	11.77 (0.81)	11.73 (.86)	11.64 (.91)	11.71 (1.43)	11.67 (.89)
Educational desire	15.39 (2.12)	15.56 (1.90)	15.69 (1.65)	15.55 (1.68)	15.33 (1.83)	15.06 (2.11)	15.47 (1.76)	15.17 (2.03)
Parental education	11.12 (2.54)	12.62 (2.46)	11.32 (2.62)	11.67 (3.19)	12.27 (2.65)	12.77 (2.51)	11.91 (2.68)	12.53 (2.71)
Number of siblings	4.93 (2.28)	4.63 (2.28)	5.66 (2.70)	5.57 (2.64)	4.80 (2.13)	4.41 (2.28)	5.14 (2.41)	4.68 (2.41)
Knowledge of the World of Work	7.11 (1.33)	7.51 (1.53)	5.70 (2.03)	6.23 (1.92)	7.22 (1.57)	7.24 (1.56)	6.62 (1.91)	7.01 (1.71)
Locus of control	6.89 (2.28)	8.24 (2.85)	8.90 (2.78)	8.54 (2.38)	8.25 (2.50)	8.16 (2.53)	8.50 (2.64)	8.25 (2.50)
Limiting health problem	.06 (.24)	.17 (.38)	.03 (.17)	.04 (.19)	.06 (.24)	.05 (.22)	.05 (.22)	.05 (.21)
Married	.17 (.38)	.31 (.46)	.21 (.41)	.12 (.33)	.19 (.40)	.19 (.39)	.20 (.40)	.18 (.38)
Discrimination	.53 (.50)	.39 (.49)	.40 (.49)	.42 (.49)	.18 (.38)	.31 (.46)	.26 (.44)	.33 (.47)
Occupational training	.84 (.37)	.73 (.44)	.88 (.32)	.90 (.30)	.87 (.34)	.85 (.35)	.87 (.33)	.86 (.34)
V.E.A.P.	.12 (.32)	.16 (.37)	.16 (.37)	.12 (.33)	.24 (.43)	.12 (.32)	.21 (.41)	.12 (.33)
School while in service	.31 (.47)	.35 (.48)	.27 (.44)	.33 (.47)	.46 (.50)	.40 (.49)	.38 (.49)	.39 (.49)
Expected enrollment status	.64 (.48)	.55 (.50)	.59 (.49)	.53 (.50)	.52 (.50)	.42 (.49)	.55 (.50)	.44 (.50)
Months of training	16.17 (16.50)	17.17 (14.39)	14.86 (18.75)	13.79 (14.08)	21.00 (19.47)	21.17 (20.77)	18.57 (19.42)	19.47 (19.68)

Table 3.2(continued)

Characteristics	Females		Males					
			Minority		White		Total	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
White-collar occupation	.37 (.48)	.55 (.50)	.20 (.40)	.22 (.41)	.29 (.46)	.20 (.40)	.26 (.44)	.20 (.40)
Blue-collar occupation	.08 (.27)	.09 (.28)	.24 (.43)	.16 (.37)	.29 (.46)	.26 (.44)	.27 (.45)	.24 (.43)
Army or Marines	.27 (.45)	.54 (.50)	.72 (.45)	.66 (.47)	.37 (.48)	.47 (.50)	.51 (.50)	.52 (.50)

*Standard deviations are denoted in parentheses. Differential sampling weights were applied to compute means and standard deviations. See footnote of Table 1.

were not satisfied with their jobs.⁵ We may conjecture with some safety that these individuals view their military jobs as their last resort for employment.

The socioeconomic status of the respondent as proxied by educational attainment of parents and the number of siblings indicates that individuals with lower socioeconomic status are more likely to intend to reenlist. This result was unexpected. Although our earlier studies showed that military service is relatively more attractive to those with lower socioeconomic status, screening at the time of entry reduces the number of lower SES accessions, so that service personnel are regarded as a more or less homogeneous group in terms of their socioeconomic status. Whether or not individuals with lower socioeconomic status are more likely to intend to be career soldiers at the time of enlistment is not clear; however, we can infer that enlistees with lower socioeconomic status think that the disadvantages due to coming from a lower socioeconomic background are less severe in the military service than in the civilian economy.

We find that individuals who have high scores on the knowledge of the world of work test are less likely to reenlist. With regard to the locus of control, we find different results for males and females: whereas those young men who have less of a sense of control over their own lives than other males are more likely to reenlist, those females who feel more in control than other females are more likely to reenlist. On the other hand, married males, particularly minority males, are more likely to reenlist than single males, while married females are less likely to do so, suggesting that the job

⁵Whether these people will be accepted for reenlistment by the military authorities is a question we will only be able to answer as the longitudinal surveys proceed.

security aspect of military service played an important role in decision making for males, but that military and family responsibilities might be considered incompatible by females.

Other findings include the negative impact of poor health conditions on positive intentions for females, the positive effect of future expected enrollment status on intentions to reenlist for both sexes (further discussed below), and the positive relationship between participation in VEAP and reenlistment intentions for males in contrast to the negative correlation between them for females. As compared to their respective counterparts who do not intend to reenlist, white males who intend to reenlist are more likely to be engaged in white collar occupations in the armed services, whereas minority males with positive intentions are more likely to work in blue collar occupations. Interestingly, both females and white males who do not intend to reenlist are heavily concentrated in the Army and Marine Corps, but at the same time minority males with positive intentions are more likely to serve in those branches.

One factor needed to examine intentions to reenlist was the expected civilian wages for those serving in the military service. Wage equations were estimated for each race and sex group with the universe restricted to out-of-school youths age 18-22. Appendix III-B presents the estimated wage equations.⁶ For the military pay variable, the pay the respondents believed

⁶Since the employment status of the in-school youths (i.e., mostly working at part-time jobs) is not considered comparable to that of the out-of-school youths (i.e., mostly working at full-time jobs), the universe was restricted to exclude the in-school youths. In order to account for the probable sample selectivity bias in selecting this universe, Heckman's technique (1979) was applied. For a detailed discussion, see Appendix II.D. For the case of males, the race-specific wage equations reported in Appendix II.F were used to compute the civilian pay variable. For the variables like unemployment rate, South, SMSA, union, tenure, and full-time employment, about which we do not have relevant information for military personnel, the mean values of each variable in the race-specific civilian wage equations were used except for

they received was used.⁷

Table 3.3 presents mean values for the perceived military pay and imputed civilian pay by race, sex, and intention to reenlist. We find significant pay differences between civilian and military pay for both sexes, particularly for white males. The perceived hourly military pay was lower than the corresponding civilian pay by about 1 dollar per hour for females and by about 1.30 dollars for males. An interesting finding is the narrower gap between the two pay levels for females and minority males than for white males, a finding which may help explain their higher reenlistment intention rates.

Although our analysis provides unique information about perceived military pay and expected civilian pay, which are supposed to play important roles in reenlistment decision making, readers are warned that comparisons between the two pay levels should be made with extreme care, because the civilian pay may represent the upper bound whereas the military pay may represent the lower one. Civilian pay is imputed under the presumption that these individuals are fully employed and, thus, should be discounted by the probability of being unemployed. On the other hand, the military pay level is underestimated in the sense that respondents generally do not assess adequately the unique military pay benefits such as the federal income tax

tenure, where zero was assigned for the imputation of civilian pay.

⁷In order to compute the expected earnings from reenlistment, many other extra income components should be included: for example, reenlistees receive regular or variable reenlistment bonuses, and there are many other sources of income, such as proficiency pay and special and incentive pays. Expected earnings from retirement benefits should also be incorporated. However, due to the lack of information about the amount of these incomes relevant for each individual, and further under the presumption that the effect of extra incomes might be considerably smaller than that of the perceived monthly pay, we simply used the amount of perceived monthly pay as earnings in the armed services. It should also be noted that the perceived pay level could be substantially different from the amount of the official Regular Military Compensation. For a detailed discussion about discrepancies between perceived pay and the official pay, see Chapter III in Kim et al. (1980).

Table 3.3 Means and Standard Deviations of Perceived Military Pay and Imputed Civilian Pay for Those Serving Their First Term of Duty, by Race, Sex, and Intentions to Reenlist: 1979* (in dollars)

Pay variables	Race-sex							
	Intentions		Females		Males			
			Total		Minority		Whites	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Military pay	3.00 (0.74)	3.28 (0.83)	3.15 (0.76)	3.17 (0.75)	3.20 (0.74)	2.97 (0.56)	3.12 (0.78)	3.22 (0.79)
Civilian pay	4.06 (0.36)	4.26 (0.32)	4.39 (0.77)	4.51 (0.61)	3.99 (1.03)	4.04 (1.02)	4.66 (0.29)	4.64 (0.31)
Military pay	0.74 (0.15)	0.77 (0.19)	0.74 (0.20)	0.71 (0.16)	0.84 (0.22)	0.77 (0.18)	0.67 (0.15)	0.69 (0.15)
Civilian pay								

*See footnote of Table 3.2.

advantage and medical care.⁸ Therefore, our focus will be on comparisons of the relative pay levels (i.e., military pay/civilian pay) between those who intend to reenlist and those who do not, rather than on direct comparisons of civilian and military pay.

We expected that the reenlistment decision would be related positively with military pay and negatively with civilian pay; but only for minority males if the ratio of military pay to civilian pay higher for those with positive intentions than for those with negative intentions.⁹

II. Empirical Results: Logit Estimations

Three different models for each race and sex group were used to determine the factors influencing intentions to reenlist: an absolute pay model, a relative pay model, and an alternative model. The absolute pay model includes both military and civilian pay variables estimated separately, whereas the relative pay model contains only the relative pay variable. The alternative model provides no pay variables but contains many other individual characteristic variables.¹⁰

⁸For example, allowances for quarters and subsistence are tax-free.

⁹Some readers might wonder why the level of the relative pay ratio (RPR) is so much different from the ratio of the mean military pay (MMP) divided by the mean civilian pay (MCP). The formulae to compute the above statistics were:

$$\begin{aligned} \text{MMP} &= \sum_i (\text{MP}_i * w_i) / \sum_i w_i, \text{MCP} = \sum_i (\text{CP}_i * w_i) / \sum_i w_i, \text{ and} \\ \text{RPR} &= \sum_i (\text{MP}_i / \text{CP}_i * w_i) / \sum_i w_i, \end{aligned}$$

where w_i represents individual's sampling weights. Since none of these three (i.e., MP, CP, w) are scalar vectors, there is no reason to expect the relationship $\text{RPR} = \text{MMP} / \text{MCP}$ to hold.

¹⁰Numerous attempts were made to incorporate employment probability into the estimations. Like the wage equation, the employment probability equation was

Reenlistment Intention Equations for Females and Males

Table 3.4 reports the estimated logit equations for females and males. For both sexes, job satisfaction always yielded the expected sign with high statistical significance. Furthermore, the magnitude of the coefficients was very large and did not vary across different models, indicating that the contribution of job satisfaction to reenlistment intention is substantial and that the coefficients are stable regardless of the model specifications. The pay variables did not produce significant coefficients.¹¹ However, an interesting finding emerged from the alternative model for males. The model indicates that male military personnel who think that they have less control over their future are more likely to intend to reenlist, other things held constant.

estimated for civilians age 18 to 22 (both the total population and out-of-school population) and this equation was used to impute the expected employment probability for those serving in the military. Since this equation was specified similarly to the wage equation, inclusion of this variable did not help explain the variations in the dependent variable, but only reduced the statistical significance of the other variables. Even from the theoretical viewpoint, this result is to be expected. A higher quality individual not only receives higher wages but also is less likely to be unemployed. Thus, the employment probability variable was not included.

¹¹The two pay models differ in their underlying assumptions: if individual behavior in response to changes in civilian pay is assumed to be different from response to changes in military pay, then the former model is more relevant. However, if symmetric responses (the same elasticities between the two pay variables) are assumed, then the latter model may be applied. We were not successful in determining statistically significant relationships between reenlistment intentions and pay variables, although in some cases (particularly for minority males) the direction of causality turned out to be consistent with our expectations. The statistical insignificance of the pay variables was primarily due to severe collinearity with other key explanatory variables. Length of service and marital status dictate the level of military pay for most of these low ranked first-term enlistees. Likewise, civilian pay, which was imputed based upon the estimated wage equation, was also correlated with many variables such as knowledge of the world of work test score, socioeconomic status, marital status, and educational attainment, all of which were also included in the wage equation.

Table 3.4 Logit Estimations for Positive Reenlistment Intentions by Sex: 1979 First-Term Enlistment^a

Variables	Sex		Females			Males		
	Model		Absolute pay model	Relative pay model	Alternative model	Absolute pay model	Relative pay model	Alternative model
Constant			-0.1036 (-0.10)	0.1629 (0.24)	0.4997 (0.63)	-1.9508** (-2.61)	-1.6268** (-3.09)	-1.7059** (-2.80)
Job satisfaction			0.7878** (4.89)	0.7834** (4.96)	0.7266** (4.52)	0.9939** (8.16)	0.9871** (8.13)	1.0201** (8.17)
Military pay (MP)			-0.0005 (-0.56)			0.0004 (0.55)		
Civilian pay (CP)			0.0007 (0.29)			0.0007 (0.54)		
Relative pay (MP/CP)				-0.1941 (-0.54)			0.2042 (0.59)	
Ability measure					0.0113 (0.26)			-0.0203 (-0.62)
Locus of control					-0.0223 (-0.84)			0.0426* (1.95)
Parental education					-0.0232 (-0.86)			-0.0033 (-0.17)
Educational desire			-0.0578 (-1.41)	-0.0573 (-1.40)	-0.0599 (-1.42)	-0.0074 (-0.24)	-0.0055 (-0.18)	0.0125 (0.38)
Expected enrollment status			0.0645 (0.47)	0.0630 (0.46)	0.0563 (0.42)	0.1776 (1.61)	0.1717 (1.56)	0.1517 (1.35)
V.E.A.P.			0.0171 (0.10)	0.0140 (0.08)	0.0138 (0.08)	0.3671** (2.65)	0.3621** (2.62)	0.3602** (2.50)
Marital status					-0.2295 (-1.59)			0.3258** (2.55)
Army/Marines			-0.3921** (-3.04)	-0.3935** (-3.06)	-0.4006** (-3.08)	0.0275 (0.25)	0.0092 (0.08)	-0.0694 (-0.60)
Length of service					0.0014 (0.23)			-0.0106** (-2.12)
White collar occupation			-0.1021 (-0.79)	-0.1033 (-0.80)	-0.0955 (-0.74)	-0.1473 (-1.13)	-0.1438 (-1.10)	-0.1287 (-0.97)
Blue collar occupation			-0.0119 (-0.05)	-0.0133 (-0.06)	0.0219 (0.10)	0.1893 (1.52)	0.1900 (1.53)	0.1749 (1.39)

Table 3.4(continued)

Variables	Absolute pay model	Relative pay model	Alternative model	Absolute pay model	Relative pay model	Alternative model
Hispanic	0.2477 (0.90)	0.2500 (0.91)	0.2560 (0.92)	0.2756 (1.20)	0.3590* (1.79)	0.3592 (1.11)
Black	0.4151** (2.33)	0.4249** (2.57)	0.4427** (2.47)	0.6860** (3.65)	0.5664** (4.10)	0.5741** (4.33)
Log of likelihood ratio	-207.70	-207.71	-205.81	-309.22	-309.54	-302.59
Sample size	373	373	373	682	682	682

^aNumbers in parentheses represent asymptotic t-statistics.

* Significant at the .05 level, one-tailed test.

**Significant at the .025 level, one-tailed test.

We also find significant sex differences in the effects of length of service and marital status, holding other factors constant. Males who have served longer are less likely to remain in the service, but we do not find such an inverse relationship for females. Earlier, we inferred that the inverse relationship between intention and the length of service might indicate growing dislike for military service and/or recognition of its hardships. However, the results based upon the pay level comparisons suggest further that the inverse relationship may reflect widening differences between military and civilian pay for males. Married male personnel are more likely to intend to reenlist while married female enlistees are less likely to intend to reenlist, possibly indicating the significance of the job security aspect in the military service for males and the difficulties in harmonizing family responsibilities and military life for females.

The positive coefficients on participation in VEAP and future enrollment status among males were unexpected. The same signs between the two variables are theoretically consistent; that is, if one wants to go back to school in the future, participation in VEAP is a natural decision. However, considering that the net returns to investment in education are inversely related to age, an inverse relationship was expected between reenlistment intentions and higher educational goals,¹² but evidently other factors, e.g., the increasingly high costs of education, are operating.

We do not find significant differences in reenlistment intentions across occupational specialties for either sex. The reenlistment intentions of the military personnel engaged in white collar or blue collar occupations were not significantly different from those of persons working in non-white and non-

¹²For the rationale of this inverse relationship between age and the net returns to investment in education, see Chapter I.

blue collar occupations.¹³ We find significantly lower reenlistment intention rates among females serving in the Army or Marine Corps, but this branch-specific relationship did not hold for males. Finally, blacks of both sexes have much higher intentions to reenlist than do whites.

Reenlistment Intention Equations for Minority and White Males

The race-specific equations for males appear in Table 3.5. For both white and minority males, job satisfaction status turned out to be a strong indicator of positive intentions. It was such a dominant factor that there was very little variability in the magnitude of the coefficients among different models.¹⁴

Very significant race differences appear for most of the variables. For example, an inverse relationship between the knowledge of the world of work test score and positive intentions to reenlist is only pertinent to minority behavior, not to white behavior. The results also reveal that our finding that male military personnel who have less sense of control over their lives are more likely to reenlist is largely a white phenomenon. The positive

¹³The residual non-white and non-blue collar occupations, which are an omitted category in the estimations, consist of infantry, gun crews, seamanship specialists, and a small number of students and trainees who were not yet assigned to their specialties (i.e., MOS/RATINGS/AFSC). The percentage distributions among white-collar, blue-collar, and residuals are, respectively, 28 percent, 29 percent, and 43 percent for males, and 60 percent, 10 percent, and 30 percent for females.

¹⁴Because of its dominant influence on reenlistment intentions, it was suspected that inclusion of this variable might have decreased the significant role of the other variables. However, estimations excluding this variable did not increase the statistical significance of the other variables. In other words, we did not find any significant collinearity problem in the estimations. Comparisons of R^2 s from the OLS estimations when each right hand side variable is regressed against all other right hand side variables also supported our contentions of no significant collinearity problem. (R^2 of the job satisfaction status was one of the lowest among all variables.)

Table 3.5 Logit Estimations for Positive Reenlistment Intentions by Race: 1979 Male First-Term Enlistees^a

Variables	Sex Model	Male minorities			Male whites		
		Absolute pay model	Relative pay model	Alternative model	Absolute pay model	Relative pay model	Alternative model
Constant		-1.8417* (-1.67)	-2.1370* (-1.96)	-1.4892 (-1.32)	-2.4114** (-2.15)	-1.3599** (-2.16)	-2.1095** (-2.68)
Job satisfaction		0.8131** (4.33)	0.8068** (4.30)	0.8643** (4.38)	1.1330** (6.64)	1.1174** (6.58)	1.1753** (6.74)
Military pay (MP)		0.0020 (1.34)			-0.0003 (-0.31)		
Civilian pay (CP)		-0.0006 (-0.34)			0.0024 (1.05)		
Relative pay (MP/CP)			0.7264 (1.18)			-0.0640 (-0.15)	
Ability measure				-0.0911* (-1.65)			0.0407 (0.91)
Locus of control				0.0226 (0.62)			0.0578** (2.05)
Parental education				0.0161 (0.50)			-0.0156 (-0.58)
Educational desire		0.0265 (0.44)	0.0334 (0.56)	0.0651 (0.95)	-0.0175 (-0.47)	-0.0153 (-0.42)	0.0053 (0.13)
Expected enrollment status		0.1489 (0.80)	0.1362 (0.73)	0.0792 (0.41)	0.1943 (1.39)	0.1844 (1.32)	0.1582 (1.11)
V.E.A.P.		0.3105 (1.09)	0.2949 (1.04)	0.2526 (0.84)	0.3870** (2.40)	0.3746** (2.33)	0.3802** (2.27)
Marital status				0.2506 (1.03)			0.3996** (2.55)
Army/Marines		0.2288 (1.10)	0.2033 (0.98)	0.1124 (0.49)	-0.0430 (-0.32)	-0.0760 (-0.59)	-0.1475 (-1.05)
Length of service				-0.0141 (-1.53)			-0.0108* (-1.73)
White collar occupation		-0.1701 (-0.76)	-0.1163 (-0.74)	-0.1250 (-0.55)	-0.1504 (-0.93)	-0.1413 (-0.87)	-0.1674 (-0.99)
Blue collar occupation		0.2617 (1.08)	0.2652 (1.10)	0.2482 (1.02)	0.1633 (1.10)	0.1566 (1.06)	0.1504 (1.00)

Table 3.5(continued)

Variables	Male minorities			Male whites		
	Absolute pay model	Relative pay model	Alternative model	Absolute pay model	Relative pay model	Alternative model
Hispanic	-0.1277 (-0.33)	-0.0158 (-0.06)	-0.2858 (-1.23)			
Log of likelihood ratio	-97.64	-97.85	-94.79	-208.70	-209.25	-203.38
Sample size	171	171	171	511	511	511

^aNumbers in parentheses represent asymptotic t-statistics.

* Significant at the .05 level, one-tailed test.

**Significant at the .025 level, one-tailed test.

impacts of VEAP and future enrollment status on reenlistment also turned out to be principally relevant for whites, as did the higher likelihood of reenlistment for married military personnel. Both races, however, show an inverse association between reenlistment intentions and length of service.

We showed earlier that over one-third of the minority respondents expressed positive intentions to reenlist whereas only about one in every five white males did so. The characteristics of this third are not clearly differentiable from those of the remaining two-thirds except that they are more satisfied with their jobs, less knowledgeable about labor market occupational structure, and they served shorter periods of time in the armed services. However, we can distinguish the unique characteristics of the one-fifth of whites who have positive intentions from those of the rest: white males who are more satisfied with their jobs, who think they have less control over their future, who are married, who participated in VEAP, who expect to enroll in school in five years, and who are relatively recent entrants to the armed services are more likely to intend to reenlist.

III. Global Job Satisfaction and Its Components: A Special Analysis

The single predominant factor in reenlistment decisions for all race and sex groups and for the differently specified models as discussed above was undoubtedly global job satisfaction during service in the military. Although this finding may appear trivial, it has significant policy implications. Given that job satisfaction status has a dominant influence on the reenlistment decision, we need to identify its elements. Understanding job satisfaction is particularly significant in light of the unique military employment contract: while employees in the civilian economy are free to

change their employers, enlistees in the military are not, at least in principle, during their term of contract.

The NLS data furnish information about ten sub-items of global job satisfaction status. They are: (1) doing what you do best, (2) (pleasant) physical surroundings, (3) learning valuable skills, (4) dangerous job, (5) (unhealthy) working conditions, (6) (good) pay, (7) job security, (8) friendly co-workers, (9) competent supervisor, and (10) chances for promotion. The degree of satisfaction for each item is recorded as a four-point ordinal scale. In this analysis we regress the dependent variable, global job satisfaction (also expressed as a four-point ordinal statistic), against all of the above sub-items.¹⁵

To estimate these equations, the universe is divided into two sub-groups: those with positive intentions and those with negative intentions. The subdivision of the universe is based upon the hypothesis that factors affecting job satisfaction positively might be different from those which affect it negatively.¹⁶ A complete set of equations is presented in Appendix III-C. Table 3.6 presents the three most important elements of global job satisfaction status by race, sex, and intentions to reenlist.

Sex Differences

Among females with positive intentions, "(good) pay" was found to be the most important component for job satisfaction while for males "chances for

¹⁵For these estimations, equal distance scoring of the ordinal statistics is implicitly assumed. For discussions of the validity of rank-order categories, see O'Brien (1979).

¹⁶For comparisons of job satisfaction status between those in the civilian economy (working full-time) and those serving in the military, see chapter III in Kim et al. (1980).

Table 3.6 Rankings of Important Elements for Global Job Satisfaction Status by Race, Sex, and Intentions to Reenlist: 1979 First-Term Enlistees*

Ranking	Positive intentions		Negative intentions	
	Females	Males	Females	Males
1	Good pay	Chances for promotion	Unpleasant physical surroundings	Poor pay
2	Learning valuable skills	Do what you do best	Few chances for promotion	Not learning valuable skills
3	Pleasant physical surroundings	Learning valuable skills	Not doing what you do best	Unhealthy working condition
Ranking	Positive intentions		Negative intentions	
	Males		Males	
	Minority	White	Minority	White
1	Pleasant physical surroundings	Chances for promotion	Unpleasant physical surroundings	Poor pay
2	Do what you do best	Learning valuable skills	Unhealthy working condition	Not learning valuable skills
3	Chances for promotion	Good pay	Not learning valuable skills	Unhealthy working condition

*A complete set of equations is found in Appendix III-C. The rankings are based upon the magnitudes and significance of the standard (beta) coefficients.

promotion" was cited as more important than others. For both sexes, "learning valuable skills" was also an important factor. For females with negative intentions, "(unpleasant) physical surroundings" served as the leading indicator of their dissatisfaction with their jobs, whereas "(poor) pay" was most important for males. These findings, particularly the relationship between pay and job satisfaction, support our earlier contentions about the link between reenlistment intentions and pay levels based on the data from Table 3.3, which showed the gaps between civilian and military pay were smaller for females and minority males than for white males. The fact that pay satisfaction is the highest correlate of global job satisfaction for both females with positive intentions and males with negative intentions supports the contention that some women intend to reenlist because they perceive that their military pay is good, whereas some men do not intend to reenlist because they think they are not adequately paid. However, the obverse does not hold: "good pay" (or lack of it) is neither the principal element for males' positive intentions nor for females' negative intentions.

Race Differences

We also find considerable race differences. Surprisingly, for minority males the pay item was not one of the three most important components of job satisfaction either for those with positive intentions or for those with negative intentions. This result indirectly implies that pay was not a key factor for reenlistment intentions for minority males. White males with positive intentions rated "chances for promotion" as the most important factor for job satisfaction, while the "(poor) pay" item appeared to be the primary reason for dissatisfaction among those with negative intentions. Considering that no wage discrimination exists in the military, as contrasted to the wide

wage differences between whites and minorities in the civilian labor market, it was not surprising to find that pay was most important for job dissatisfaction among white males with negative intentions, and that "(poor) pay" was not included in the three most important factors for job dissatisfaction among minority males with negative intentions.

IV. Probability Estimates and Partial Derivatives

Here we present the probability estimates of reenlistment intentions, conditional upon the potential reenlistee's personal and relevant environmental characteristics, and show how these estimates for positive intentions to reenlist would vary due to differences in certain individual characteristics. Partial derivatives are not constant in this nonlinear estimation; therefore, in order to make comparisons simpler between different race and sex groups, we will configure a typical person.¹⁷ The person is configured to have served 24 months in the military, to be satisfied with the military job, to be married, and not in white collar or blue collar occupations. The highest education attained by either or both of the parents is 12 years. The individual's knowledge of labor market information is about average (KOWW score = 7), and the test score on the locus of control is also about the average of all enlistees (Rotter score = 8). Despite a desire for three more years of education, this person does not participate in VEAP and does not expect to be in school in 5 years. The perceived military pay and imputed civilian pay are, respectively, 3.25 dollars and 4.50 dollars per

¹⁷To compute the predicted probabilities for minority males in Table 3.7, a value of zero was assigned to the dummy variable Hispanic indicating the typical person for this group is a non-Hispanic black. Typical persons for the total male and female equations were configured to be white.

hour, which is thought to be underpaid by 25 percent in the military relative to the civilian alternative.

Table 3.7 presents the predicted probabilities of intending to reenlist for this hypothetical person in each race and sex group.¹⁸

Sex Differences

We have apparently high predicted probabilities (44 to 49 percent for females and 35 to 43 percent for males) for both sexes which is attributable to our assigning a high job satisfaction. Since we had substantially different coefficients for the female and male equations, it is somewhat surprising to find similar predicted probabilities for the two sexes, particularly in the alternative model where there is almost no difference.¹⁹

We do not find significant sex differences in the continuous variables. A one point change in the Rotter score would result in about a one percentage point difference for males; however, the effect is small compared to the

¹⁸The partial derivatives represent the change in predicted probabilities attributable to a unit change in a specific explanatory variable: for military and civilian pay variables, an increase of 25 cents was assumed for each variable; for relative pay, an increase of 0.05 (from 0.75 to 0.80) was hypothesized. For all qualitative variables, the partial derivatives indicate the change in predicted probability due to a change from either one to zero or zero to one. Strictly speaking, these values cannot be called partial derivatives since they are not differentiable.

¹⁹The assigned values of the continuous variables for this typical person do not deviate considerably from the mean values among the first term enlistees. However, we assigned either zero or one for the dummy variables. Although we do not expect the predicted probabilities to range around the mean reenlistment intention rates because of the characteristics of nonlinear estimation and the assigned values for qualitative variables, we still attempt to explain why their values differ so much from the mean intention rates. In our data, a little over half of males and two-thirds of females said that they are satisfied with their jobs, and a quarter of females and one-fifth of males are married. (Recall that the effect of marital status on reenlistment intentions is opposite between females and males.) The magnitudes of the partial derivatives of these two variables account for the differences between the predicted probabilities (Table 3.7) and mean intention rates (Table 3.3).

Table 3.7 Partial Derivatives of Positive Reenlistment Intentions with Respect to Selected Explanatory Variables, by Sex and Race: 1979 First-Term Enlistees

Variables	Model	Sex			Males		
		Females			Males		
		Absolute pay	Relative pay	Alternative	Absolute pay	Relative pay	Alternative
Predicted probability \hat{p}		49.24	48.53	43.89	34.91	36.15	43.34
$\Delta\hat{p}$, Length of service		-	-	0.03	-	-	-0.26*
$\Delta\hat{p}$, Parental education		-	-	-0.57	-	-	-0.08
$\Delta\hat{p}$, Knowledge of the world of work		-	-	0.27	-	-	-0.49
$\Delta\hat{p}$, Locus of control		-	-	-0.55	-	-	1.05*
$\Delta\hat{p}$, Educational desire		-1.44	-1.43	-1.47	-0.17	-0.13	0.31
$\Delta\hat{p}$, Military pay		-0.31	-	-	0.23	-	-
$\Delta\hat{p}$, Civilian pay		0.44	-	-	0.40	-	-
$\Delta\hat{p}$, Relative pay		-	-0.24	-	-	0.23	-
$\Delta\hat{p}$, Job satisfaction		-18.62*	-18.42*	-16.45*	-18.35*	-18.73*	-21.72*
$\Delta\hat{p}$, Marital status		-	-	5.66	-	-	-7.76*
$\Delta\hat{p}$, White-collar occupation		-2.55	-2.57	-2.34	-3.27	-3.25	-3.12
$\Delta\hat{p}$, Blue-collar occupation		-0.29	-0.33	0.54	4.42	4.48	4.34
$\Delta\hat{p}$, Army/Marines		-9.65*	-9.65*	-9.51*	0.63	0.21	-1.69
$\Delta\hat{p}$, V.E.A.P.		0.43	0.35	0.34	8.73*	8.69*	0.97*
$\Delta\hat{p}$, Expected enrollment status		1.61	1.58	1.39	4.14	3.97	3.76
$\Delta\hat{p}$, Hispanic		6.17	6.24	6.36	6.49	8.62*	5.95
$\Delta\hat{p}$, Black		10.26*	10.52*	11.02*	16.67*	13.78*	14.26*

Variables	Model	Race			White males		
		Minority males			White males		
		Absolute pay	Relative pay	Alternative	Absolute pay	Relative pay	Alternative
Predicted probability \hat{p}		43.76	42.94	45.14	36.39	37.29	46.15
$\Delta\hat{p}$, Length of service		-	-	-0.35	-	-	-0.27*
$\Delta\hat{p}$, Parental education		-	-	0.40	-	-	-0.38
$\Delta\hat{p}$, Knowledge of the world of work		-	-	-2.27*	-	-	1.02
$\Delta\hat{p}$, Locus of control		-	-	0.57	-	-	1.44*
$\Delta\hat{p}$, Educational desire		0.65	0.82	1.63	-0.40	-0.36	0.13
$\Delta\hat{p}$, Military pay		1.23	-	-	-0.17	-	-
$\Delta\hat{p}$, Civilian pay		-0.37	-	-	1.40	-	-
$\Delta\hat{p}$, Relative pay		-	0.89	-	-	-0.08	-
$\Delta\hat{p}$, Job satisfaction		-18.11*	-17.80*	-20.35*	-20.83*	-21.01*	-25.23*
$\Delta\hat{p}$, Marital status		-	-	-6.23	-	-	-9.65*
$\Delta\hat{p}$, White-collar occupation		-4.14	-4.02	-3.12	-3.40	-3.25	-4.12
$\Delta\hat{p}$, Blue-collar occupation		6.50	6.58	6.18	3.86	3.72	3.76
$\Delta\hat{p}$, Army/Marines		5.68	5.03	2.81	-0.99	-1.81	-3.64
$\Delta\hat{p}$, V.E.A.P.		7.72	7.32	6.28	9.34*	9.08*	9.48*
$\Delta\hat{p}$, Expected enrollment status		3.69	3.36	1.98	4.61	4.40	3.95
$\Delta\hat{p}$, Hispanic		-3.12	-0.39	-7.09	-	-	-

*The logit coefficients are statistically significant in Tables 3.4 and 3.5.

predicted value of 43 percentage points. Job satisfaction would produce very significant impacts for both sexes. If those now satisfied no longer were, the predicted probabilities would drop by more than a third among females, and by one-half for males, again indicating the crucial role of satisfaction on reenlistment intentions.

Earlier we found that the coefficient of participation in VEAP was statistically significant for males but not for females. Also, the coefficient on expected enrollment status was marginally significant for males. The statistical significance of the coefficients indicates that the behavior of the respondents with positive intentions is distinguishable from the behavior of those with negative intentions in terms of the specific variables (or coefficients). The larger partial derivatives of the participation in VEAP and expected enrollment status variables for males imply that not only do these two variables play an important role in formulating positive intentions, they also contribute greatly to the total degree of positive intentions.

Race Differences Among Males

The alternative model always predicts higher probabilities than the other two models for both races. The over- or under-predictions are primarily attributable to the important role of marital status in the alternative model and/or to the inability of the pay variable(s) to capture the variations of positive intentions for both pay models.

While the predicted probability for a white individual is lower than that for a black person with identical characteristics by 7 percentage points according to the absolute pay model, it is almost the same as that for a black person according to the alternative model (the difference is only one

percentage point). Job satisfaction is the most important contributor to positive intentions for both races (18 to 20 percentage points for minorities and 21 to 25 percentage points for whites). Marital status also serves as an important factor for white males--10 percentage points.

Other variables which wield significant influence on positive intentions for both races include participation in VEAP and expected enrollment status. Their combined effects change predicted probabilities by up to 14 percentage points. However, it should be remembered that whereas the coefficients of these two variables are statistically significant for whites, they are not for minorities. These results imply that although participation in VEAP and expected enrollment status do not play an important role in statistically distinguishing minorities with positive intentions from those with negative intentions, the contributions of the VEAP and expected enrollment variables to the likelihood of reenlisting are substantial.²⁰

The KOWN score and Rotter score produce significant results for minorities and whites, respectively. However, compared to the other variables, their contributions are relatively small.

²⁰The interpretation of the coefficients is based upon the functional form of the logit estimation which we adopted throughout this analysis. Consider $\ln(p/1-p)$, where p represents the probability of reenlisting. The logit, $\ln(p/1-p)$, indicates the relative favor of the choice of the dependent variable over the nonchoice, conditional upon the given set of characteristics (a set of explanatory variables). Therefore, hypothetically, if the same proportion of persons between those who have positive intentions and those who have negative intentions exists in our universe (this is not an implausible supposition because those who want higher education may leave the service to go back to school immediately or may extend their service in order to take advantage of more extensive post-service educational benefits), then the logit coefficient may turn out to be statistically insignificant although the variable itself plays an important role in decision making for individuals in both directions.

V. Summary of Findings and Policy Implications

The goal of this chapter was to study the reenlistment decision, which is a major means of achieving desired manpower requirements. Demographic developments, notably a shrinking of the youth population, motivated this approach.

The study identified the determinants of positive reenlistment intentions using the 1979 NLS Youth Cohort data. The universe consisted of individuals serving their first term of duty in the active forces. Because we expect differential behavior between males and females, our analysis was stratified by sex. We further stratified the male sub-universe by race; due to small sample size the race dimension was not added for the female sub-universe. A further unique feature of this analysis lies in its use of potential civilian earnings for the reference group.

Our analysis revealed several important findings. First, with other factors held constant, job satisfaction of military personnel turned out to be a strong indicator of positive reenlistment intentions. This seemingly trivial finding has significant policy implications. Under the All Volunteer Force (AVF) system military service is viewed as a job which directly competes with civilian employment. An alternative hypothesis is that service in the military is regarded as a temporary transition, not as a career job, and that the primary motivation for participation in the armed services is to acquire some needed skills for future civilian employment and/or to take advantage of post-service educational benefits. Our finding of a positive relationship between job satisfaction and extension of the service period, other things held constant, supports the first hypothesis, that service in the military is regarded by many as a career, an alternative to civilian employment.

Second, we found a significant positive impact of marital status (i.e., being married) on reenlistment intentions for males and a negative impact for females. This finding, particularly for males, can be interpreted as additional evidence that military service is thought of as a long-term alternative to civilian employment. Because of its peculiar features such as frequent relocation and restrictive regulations, a military job has often been thought to suit single persons more readily than married persons. However, the positive impact of marital status for males points up the significant role of job security in the reenlistment decision: the opportunity costs of unemployment are greater for married than for single persons. The negative impact of marital status on reenlistment intentions for females suggests that married female enlistees perceive it difficult to harmonize marriage and assigned military tasks.

Third, we also found strong positive influences of future enrollment intentions and participation in VEAP on intentions to remain in the service for males, particularly for white males. This result is rather surprising because those who want to go back to school are expected to leave the service at the end of the term of duty. One possible explanation is that these individuals plan to qualify for more extensive post-service benefits.

Fourth, minority males who are less knowledgeable about the labor market information (KOWW) and white males who think they do not have control over their future (Rotter) are more likely to intend to reenlist than their corresponding peers. The highly structured environments of the armed services probably appeal to these men's needs for predictability, and the relative narrowness of the range of daily chores might be comforting to those whose sense of personal freedom and power is less than average. Under the presumption that the KOWW score (which is also frequently used as a proxy for

intellectual ability) is positively correlated with employability in the civilian labor market, the result for minority males indicates that military service functions for them as a last resort for employment. The finding for white males is not surprising because it is generally expected that persons who are more self-directed are more likely to invest in education or to choose civilian jobs due to available opportunities as compared to the relatively inflexible organizational structure in the military.

Fifth, we were not successful in determining significant relationships between pay levels (either military and civilian pay or relative pay) and positive reenlistment intentions. The sensitivity of military pay relative to comparable civilian pay has drawn attention in reenlistment studies. Due to the complexities in computing the expected earnings streams from military jobs and civilian alternatives, we are very hesitant about drawing specific conclusions from our results although it may be true that, as our results indicate, the behavior of these first-term enlistees is not highly responsive to pay changes.

We did find, however, a significant inverse relationship between intentions to reenlist and length of service among males but not among females. This may reflect widening gaps between military and civilian pay levels as individuals serve longer periods.

Sixth, we do not find significant differences in reenlistment intentions across military occupational specialties--among white-collar, blue-collar, and non-white and non-blue-collar occupations--for either sex. On the other hand, the reenlistment intention rates among females serving in the Army or Marines were lower than those serving in the Navy or Air Force, while this branch-specific relationship did not hold for males.

Finally, because global job satisfaction status was such a dominant

factor in reenlistment intentions, it was further decomposed into several identifiable elements of overall job satisfaction. We found differences in the rankings of these factors among different race/sex groups. Perhaps the most interesting is that level of pay is the most important element of job satisfaction only for females with positive intentions and for males with negative intentions. In other words, the pay level was not the most important factor in global job satisfaction among females with negative intentions, nor among all minority males, nor among white males with positive intentions. This is consistent with our earlier finding of the nonsignificance of the pay variables. In fact, what it reflects is the absence of wage discrimination against race and sex in the military as contrasted to the wide wage differences between white males and other race-sex groups in the civilian economy. Therefore, we can safely conclude that the use of the military pay as a strategic tool to enhance the reenlistment rates among first term enlistees is not likely to be very successful unless the changes in pay level are dramatic. On the other hand, pleasant physical surroundings, chances for promotion, and learning valuable skills were among the important factors contributing to global job satisfaction among those with positive intentions.

Appendix III-A

A Model for the Potential Supply of Reenlistment

Theoretical Considerations

A young person is assumed to compare his expected military and civilian earnings streams when deciding whether to reenlist, other things held constant. Let $W_M^1 \dots W_M^k$ denote the expected earnings streams during the time in military service for individuals who reenlist. For those who do not reenlist, the best alternative would be the expected earnings streams in the civilian economy, $W_C^1 \dots W_C^k$. In making the decision to reenlist, the individual compares the present discounted value (PDV) of the expected earnings from reenlisting with that from not reenlisting over the life cycle. Suppose that n represents an individual's expected lifetime working periods. Then the PDV of the expected earnings for potential reenlistees and the non-reenlistees can be expressed as follows:

$$PDV_M = \sum_{i=1}^k \frac{W_M^i}{(1+r)^i} + \sum_{i=k+1}^n \frac{W_{MC}^i}{(1+r)^i}$$

$$PDV_C = \sum_{i=1}^k \frac{W_C^i}{(1+r)^i} + \sum_{i=k+1}^n \frac{W_C^i}{(1+r)^i}$$

where r denotes the individual's subjective discount rate, k represents the number of years of duty in military service, and W_{MC} is the expected earnings stream of the potential reenlistee in the civilian economy after the individual is retired from the military from the $k+1^{th}$ period to the n^{th}

period. Two observations, one by Fisher (1969) and the other by Cooper (1977), showed little difference between a veteran's and a nonveteran's earnings. These findings indicate that the second terms of PDV_M and PDV_C are approximately the same. Consequently, the decision rule for reenlistment reduces to comparisons between the first terms: an individual's reenlistment decision is positively related to PDV_M and negatively correlated with PDV_C .

It should also be noted that this decision rule is not complete in the sense that the compensating wage differential is ignored in the computation of expected earnings. That is, if correctly specified, the decision should be made by comparing PDV_M versus $PDV_C + d * PDV_C$, where d is a coefficient measuring the relative preference for military service--e.g., preference for or aversion to certain jobs; this variable also proxies for the component of nonpecuniary returns of expected earnings. If an individual dislikes the military service, then d may have a positive value; if he likes the service, then d may be negative. The term $d * PDV_C$ gives the amount of compensating differentials which would induce reenlistment. However, in the actual estimations, this component is ignored (or proxied for by certain individual characteristics) because d cannot be measured appropriately.

The importance of discounting depends upon the time profile of returns in the military service and civilian occupations. The returns can be sensitive with respect to the choice of discount rate if the two earnings streams show quite different time patterns.

A missing component in the above computation of expected earnings streams is the expected employment probability. Considering that being unemployed is not a likely event in the military (although some are dismissed), incorporating employment probability into the model specification is particularly important: employment probability may enter as a separate

independent variable or as an element in the calculation of the expected earnings streams for future civilian jobs. One methodological problem associated with using employment probability as an independent variable is that it is closely related to the expected wage levels of individuals, except for seasonal workers. In other words, a less skilled individual is not only paid lower wages, but is also likely to be unemployed more frequently than a highly skilled individual.

Empirical Specifications

The reenlistment supply function is specified in the following form with the expected signs of the coefficients denoted in parentheses.

$$\begin{aligned}
 \text{REENL} = & F(\text{JOBSAT}, \text{TENURE}, \text{DIFF}, \text{PARED}, \text{SIBLINGS}, \\
 & \quad (+) \quad (-) \quad (+) \quad (-) \quad (+) \\
 & \text{HEALTH}, \text{MARRY}, \text{VEAP}, \text{SCHSV}, \text{MOSTR}, \text{ARMY/MARINES}, \text{KOWW}, \\
 & \quad (-) \quad (?) \quad (?) \quad (?) \quad (?) \quad (-) \quad (-) \\
 & \text{ROTTER}, \text{CP}, \text{MP}, \text{EMP}), \\
 & \quad (+) \quad (-) \quad (+) \quad (-)
 \end{aligned}$$

where REENL has a value one if one wants to reenlist; JOBSAT indicates whether or not one is satisfied with his/her branch; DIFF and PARED represent, respectively, the difference in the number of years between aspired and completed years of schooling and the educational attainment of the more educated parent. SIBLINGS indicates the number of siblings plus one to include the respondent. HEALTH, MARRY, VEAP, SCHSV, and ARMY are all binary variables representing, respectively, health status (if work limiting = 1), marital status (if married = 1), participation in the Veterans Educational

Assistance Program (if participated = 1), receipt of educational benefits while in service (if received = 1), and branch of service (if Army or Marine Corps = 1). KOWW, which is used as a proxy for an ability measure, mainly captures the respondent's degree of labor market information regarding occupational descriptions, and ROTTER indicates the score on the locus of control test. Finally, CP, MP, and EMP represent civilian pay, military pay, and employment probability, respectively.

The dependent variable is binary (a one-zero indicator) and as such is assumed to follow the logistic distribution. Ordinary least squares will not be used to estimate the unknown parameters since it does not constrain the individual probabilities between zero and one. Moreover, OLS is inefficient because of the heteroskedasticity introduced when the outcome is a binary choice variable.

Appendix III.B.1: Probit Estimations for Employment Probability Among Out-of-School Female Youths Age 18-22 (Non-Farm and Non-Self-Employed): 1979^a

Constant	-1.0103 (-1.69)
Parental education	-0.0117 (-1.00)
Siblings	-0.0337 (-2.62)
Ability measure	0.0417 (2.44)
Educational attainment	0.1079 (3.62)
High school diploma	0.6046 (6.25)
Health status	-0.6522 (-6.31)
Marital status	-0.3064 (-4.37)
Local unemployment rate	-0.0073 (-0.40)
South	0.1120 (1.55)
Live in SMSA	0.2864 (3.95)
Age	-0.0134 (-0.48)
Discrimination	0.0267 (0.35)
Hispanic	-0.0729 (-0.51)
Black	-0.6103 (-3.83)
- 2 times log likelihood ratio	423.07
N	1856
N (Dep = 1)	1026
N (Dep = 0)	830

^aNumbers in parentheses are asymptotic t-statistics.

Appendix III.B.2: Least Squares Estimates of Log Wage Equations with Lambda
 (λ) Among Out-of-School Female Youths Age 18-22 (Non-Farm
 and Non-Self-Employed): 1979^a

Constant	5.3331 (14.57)
Age	0.0404 (3.83)
Ability measure	-0.00002 (-0.00)
Educational attainment	-0.0134 (-0.81)
High school diploma	-0.0944 (-1.14)
Health status	0.0962 (1.10)
Marital status	0.0573 (1.33)
Local unemployment rate	0.0001 (0.01)
South	-0.0872 (-2.96)
Live in SMSA	0.0062 (0.16)
Discrimination	-0.0126 (-0.47)
Union	0.1555 (4.65)
Tenure	0.0018 (0.18)
Full-time worker	0.1375 (4.84)
Hispanic	0.0521 (0.99)
Black	0.0918 (1.00)
Lambda	-0.4242 (-2.11)
\bar{R}^2	0.102
S.E.E.	0.340
N	940

^aNumbers in parentheses indicate t-statistics.

Appendix III.C.1: Least Squares Estimates for Global Job Satisfaction Status Against Ten Important Satisfaction Components Among Those Who Intend to Reenlist, by Race and Sex: 1979 First-Term Enlistees^{a, b}

	Females	Males		
		Minority	White	Total
Do what you do best	0.1254 (1.23)	0.1583 (1.04)	0.0531 (0.45)	0.1298 (1.45)
Pleasant physical surroundings	0.1523 (1.55)	0.2957 (2.17)	-0.0827 (-0.72)	0.0879 (1.03)
Learning valuable skills	0.2030 (1.87)	0.0968 (0.79)	0.1995 (1.85)	0.1194 (1.53)
Dangerous job	-0.0515 (-0.49)	0.0169 (0.13)	0.0530 (0.49)	0.0534 (0.66)
Unhealthy working conditions	0.0265 (0.23)	0.0719 (0.56)	0.0457 (0.39)	0.0481 (0.58)
Good pay	0.2377 (2.39)	0.1070 (0.76)	0.0977 (0.88)	0.0903 (1.06)
Job security	0.0033 (0.03)	0.0231 (0.16)	0.0869 (0.78)	0.0583 (0.68)
Friendly co-workers	-0.0260 (-0.26)	0.0924 (0.75)	0.0439 (0.42)	0.0747 (0.96)
Competent supervisor	0.0199 (0.21)	-0.1074 (-0.71)	0.0930 (0.86)	-0.0035 (-0.04)
Chances for promotion	-0.1014 (-0.98)	0.1576 (1.03)	0.2010 (1.83)	0.1600 (1.91)
Constant	2.0302 (4.57)	1.1621 (2.25)	1.1969 (2.14)	1.2263 (3.47)
R^2	0.16	0.21	0.10	0.16
N	116	65	97	162

^a All variables are four-point scale ordinal statistics: i.e., 4 = most satisfied and 1 = most dissatisfied. "Dangerous job" and "Unhealthy working conditions" are invertly recoded, for example, 1 is assigned to most dangerous job. Therefore, the expected sign of coefficients is positive for all variables.

^b Coefficients are standardized (i.e., beta coefficients) and numbers in parentheses represent t-statistics. Constant terms are unstandardized coefficients.

Appendix III.C.2: Least Squares Estimates for Global Job Satisfaction Status Against Ten Important Satisfaction Components Among Those Who Do Not Intend to Reenlist, by Race and Sex: 1979 First-Term Enlistees^{a,b}

	Females	Males		
		Minority	White	Total
Do what you do best	0.1567 (2.49)	-0.0548 (-0.52)	0.0938 (1.77)	0.0610 (1.32)
Pleasant physical surroundings	0.1751 (2.70)	0.1725 (1.73)	0.0776 (1.52)	0.0978 (2.19)
Learning valuable skills	0.1331 (2.19)	0.1519 (1.55)	0.1342 (2.67)	0.1352 (3.06)
Dangerous job	0.0180 (0.30)	-0.0705 (-0.67)	0.0417 (0.86)	0.0185 (0.43)
Unhealthy working conditions	0.0040 (0.06)	0.1656 (1.51)	0.1226 (2.37)	0.1221 (2.67)
Good pay	0.1444 (2.48)	0.1409 (1.44)	0.2004 (4.19)	0.1817 (4.32)
Job security	0.1247 (1.97)	-0.0313 (-0.33)	0.0031 (0.07)	0.0005 (0.01)
Friendly co-workers	0.0276 (0.44)	0.0804 (0.80)	0.0944 (1.92)	0.0822 (1.87)
Competent supervisor	-0.0165 (-0.27)	0.0960 (0.94)	0.1089 (2.17)	0.1150 (2.59)
Chances for promotion	0.1606 (2.63)	0.1158 (1.18)	0.0933 (1.91)	0.1100 (2.57)
Constant	0.1376 (0.41)	0.4461 (1.02)	-0.1558 (-0.54)	0.0323 (0.14)
R^2	0.28	0.13	0.22	0.21
N	250	115	385	500

a,b See footnotes on Appendix III.C.1.

Glossary

Universes:

Chapter 1 - Males who graduated from high school with a diploma between May and December, 1978. (A small number of males who graduated from high school after May 1978 but entered the military service before May 1978 were excluded from our analysis unless they were on delayed entry programs.)

Chapter 2 - Males who have never served in the (active) armed forces.

Chapter 3 - Male and female military personnel serving their first term of duty in the active forces.

Dependent variables:

Chapter 1 - Those who joined the (active) armed forces since graduation were assigned category 1, Military. Those who do not belong to category 1 but attended college since graduation were assigned category 2, College. The rest were assigned category 3, Other civilian pursuits.

Chapter 2 - 1 if respondent thinks he will definitely or probably try to enlist in the military in the future; 0 otherwise.

Chapter 3 - 1 if respondent thinks he/she will definitely or probably reenlist at the end of the current term of service; 0 otherwise.

Ability measure

= Score on "Knowledge of the World of Work" test, 0 (lowest score) to 9 (highest score).

Age over 17

= 1 if respondent is 17 years old or over (for Ch. 2 high school senior universe only); 0 otherwise.

Age

= age of respondent at interview.

Army or Marines

= 1 if respondent is serving in the Army or Marines (Ch. 3 only); 0 otherwise.

Black

= 1 if respondent is black; 0 otherwise.

Blue collar	= 1 if respondent's military occupational area is clerical/mechanical equipment repairman or craftsman (Ch. 3 only); 0 otherwise.
Civilian pay	= respondent's predicted hourly pay (in cents) on the basis of age, parental education, siblings, ability measure, educational attainment and aspirations, high school diploma, health status, married, discrimination, tenure, and mean values for local unemployment rate, South, and union (Ch. 3 only).
Discrimination	= 1 if respondent felt he had trouble obtaining a good job due to discrimination on the basis of race, nationality, sex or age; 0 otherwise.
Educational aspirations	= number of years of regular schooling the respondent would like to obtain.
Educational attainment	= number of years of regular schooling completed by respondent as of interview date.
Educational desire	= number of years of regular schooling respondent must attain to reach his/her desired level of education.
Educational discrepancy	= years of desired education minus years of expected education.
Enrolled	= 1 if respondent is enrolled in regular school as of interview date; 0 otherwise.
Environment	= 1 if respondent (or any other family member) received a magazine and a newspaper regularly and had a library card when respondent was age 14; 0 otherwise.
Experience	= number of years after leaving school minus number of years worked on current job (Ch. 2)
Health status	= 1 if respondent's health limits the kind or amount of work that he/she can perform (Ch. 3); 0 otherwise.

High school diploma	= 1 if respondent has a high school diploma; 0 otherwise.
In school in 5 years	= 1 if respondent expects to be in school 5 years from date of interview; 0 otherwise.
Internality	= score on "Rotter Internality-Externality" test, which gauges respondent's perception of his/her control over surrounding circumstances (4 = internal to 16 = external).
Job satisfaction	= 1 if respondent is, taking all things together, very or somewhat satisfied with her/her term of service in the armed forces (Ch. 3); 0 otherwise.
Labor union	= 1 if in a labor union; 0 otherwise.
Length of service	= number of months respondent has served in the armed forces (Ch. 3).
Married	= 1 if respondent was married with spouse present at interview date; 0 otherwise.
Military pay	= hourly pay (in cents) of respondent before taxes and other deductions, including basic pay allowances for housing or food and any special pay (Ch. 3 only).
Months of training	= number of months of formal school training and/or on-the-job training that the respondent received in the service (Ch. 3 only).
Not in labor force	= 1 if respondent's employment status is "not in the labor force"; 0 otherwise.
Parental education	= highest grade of school (in years) which either of respondent's parents has completed.
Parents in military	= 1 if respondent's mother or father served in the military in 1978 or when respondent was 14 years old; 0 otherwise.

- Parental occupation = 1 if parental occupation (father's; however, if respondent does not have a father and does have a mother, then this is the mother's occupation) is white collar; 0 otherwise.
- School while in service = 1 if respondent took any courses for which he/she received high school or college credit during his/her term of service (Ch. 3); 0 otherwise.
- Siblings = number of siblings of respondent plus one.
- Significant others = 1 if respondent believes that his significant other would approve (somewhat or strongly) if respondent decided to join the armed forces (Ch. 2, 14-17 year old respondents only); 0 otherwise.
- Single parent family = 1 if respondent, at age 14, did not live with both of his natural parents; 0 otherwise.
- South = 1 if respondent lived in South (by Census classification) as of: Chapter 1 - May 1978; Chapter 2 - interview date; 0 otherwise.
- Tenure = number of years worked on current job (Ch. 2)
- Training = 1 if respondent would like to receive occupational or job training other than that of high school or college; 0 otherwise.
- Unemployed = 1 if respondent's employment status is "unemployed;" 0 otherwise.
- Unemployment rate = race-sex specific state unemployment rate in 1978 for the state in which respondent lived as of: Chapter 1 - May 1978; Chapter 2 - interview date.
- Urban-rural = 1 if respondent resided in rural area as of screening interview (Ch. 2); 0 otherwise.

- V.E.A.P. = 1 if respondent (Ch. 3) participated in the Veteran's Educational Assistance Program; 0 otherwise.
- Wage = respondent's (Ch. 2, 18-21 year olds only) current wage (in cents per hour) if respondent is employed, or his imputed wage based on wage equations if unemployed.
- Weeks unemployed = number of weeks since respondent became unemployed if respondent is unemployed; 0 otherwise.
- White collar occupation = 1 if respondent's (Ch. 3) military occupational area is electronic equipment repairman, communications and intelligence specialist, medical and dental specialist, other technical and allied specialist, functional support and administration, or electrical/mechanical equipment repairman; 0 otherwise.

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